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MR. W. J. MULVEY, J.P., F.R.C.V.S.

FEW of our members have devoted more time and energy to the advancement of their profession than has the gentleman whose photograph is illustrated as the frontispiece in this month's VETERINARY JOURNAL. Graduating from the London College in 1867, Mr. Mulvey first started practice in the North of England, being resident for some time in Bishop Auckland, from which town he came to London in 1886, settling down in the Borough of Chelsea, S.W. Being elected as a Member of the Council of the Royal College of Veterinary Surgeons in 1885, he has served on that body without intermission ever since, and has been one of the moving spirits in all matters concerning the welfare both of student and practitioner. It was largely through his instrumentality that the new charter was obtained, and that "Members" of the R.C.V.S. obtained the right to sit on the Council; at one time only those who possessed the Fellowship Diploma could aspire to that honour. As Chairman of the Examination Committee, a position which he has held for twelve years, Mr. Mulvey has always been an ardent supporter of the highest possible standard of education, being particularly in favour of high matriculation and of the four years' College course, both of which are now accomplished facts. He was elected President in 1892, and Vice-President in 1893, fulfilling the manifold duties of each with assiduous earnestness. This year we welcome on behalf of the profession the new honour which has been thrust upon him, for his brother aldermen have elected him to fill the honoured office of Mayor of the Borough of Chelsea. His year of office will be no sinecure, and we wish him the health to carry out to his own satisfaction (which means that it will be done properly) the numerous duties entailed by a seat on the magisterial bench, the control of the service of a large borough, and professional duties both in the Council and in a busy city practice.

Editorials.

THE RATIONAL INSPECTION OF MEAT AND MILK.

THAT the veterinary surgeon is, by virtue of his training in the subject of the diseases of animals and their products, the proper man to inspect flesh and milk intended for human food seems self-evident, and it is hard to understand why such an enlightened country as Great Britain still hangs back in such an important matter. On the Continent the *only* man accepted for such a position is the qualified veterinary graduate, and even our Colonies are far in advance of us in this respect. That every English town should possess a public abattoir, and that the flesh of animals killed there should be rationally inspected, is a subject upon which we are all agreed, and in connection with this two notes in our columns—one the report of the Special Sanitary Commissioner of the *Lancet* on the Chicago Stockyards, and the other a report by Dr. Collingridge, the Medical Officer of Health for the City of London—are worth perusal.

In Chicago alone, according to the report, during one fortnight the two inspectors at the stockyards condemned and destroyed no less than "242 cattle, 503 hogs, 31 sheep and 9 calves, being a total of 202,901 pounds of meat unfit for human food, and ready to be offered for sale to the citizens of Chicago," whilst when additional inspectors were appointed this large amount was even greatly added to. In our English cities there is no doubt that, owing to the inadequate inspection, a very large quantity of innutritious and dangerous meat finds its way into the shops, especially in poor neighbourhoods, and the time cannot be far distant when it will be absolutely compulsory for every carcase to be branded in a large number of places with an official stamp, to show that it has been passed by a properly authorised and qualified inspector; and this inspector should, naturally, be a veterinary surgeon.

If the milk supply of London is to be taken as a criterion of what is sent to other cities, matters must indeed be in a bad way; for, according to Dr. Collingridge's report and Dr. Klein's analysis, only 68 per cent. of the samples taken could be classified as "clean and pure," whilst of the remainder 23 per cent. is termed "unclean," and 9 per cent. tuberculous.

Surely the time has arrived for us, as a profession, to take up energetic steps to bring the matter to the notice of the Government (or even of the public), through our societies and in every other way practicable, and it is even possible that we are laying ourselves open to be accused of failing in our duty towards the national welfare if we do not do so.

IS PRESCRIPTION WRITING ADVISABLE?

THE student in his third year at College will be sure to at once emphatically reply to the above question in the direct negative, for the accurate writing of a prescription such as an ordinary chemist could not find fault with, or even ridicule, seems to be a regular bugbear to the great majority. It is questionable whether the indiscriminate and wholesale distribution of prescriptions is advisable, and in another column we draw attention to an opinion from an American contemporary upon this subject; but to be able, when necessary, to put down on paper a clear and compatible description of how to prepare a neat mixture of drugs, without laying one's self open to a sarcastic criticism on the part of the dispenser, is undoubtedly one of the most important branches of the art of our profession.

A prescription is looked upon by some clients as a kind of fetish, is handed from friend to friend, and is tried on all sorts of diseases (especially if the poor beast to be treated belongs to another man), and often, if the ailment is not too serious, and the patient recovers by natural means, the wonderful supposed powers of the prescription are greatly enhanced. Often, too, much time is lost because of the use of mixtures, valuable enough in themselves when properly and rationally applied, prepared by the order of a layman, and used for some considerable time before the practitioner gets a chance of treatment, he not being called in until too late; and for this reason, above all others, the greatest care should be taken to discourage as much as possible the practice of handing prescriptions broadcast, especially amongst people whose intellect is not sufficiently developed to enable them to understand that rational therapeutics is a science which can only be successfully practised by those who have made the subject the study of a lifetime.

Original Articles.

THE ARTIFICIAL IMMUNISATION OF CATTLE AGAINST TUBERCULOSIS.*

BY LEONARD PEARSON AND S. H. GILLILAND.

(*From the Laboratory of the State Live Stock Sanitary Board of Pennsylvania.*)

A Paper presented to the Forty-second Annual Meeting of the American Veterinary Medical Association, at Cleveland, Ohio, August 15-18, 1905.

EFFORTS to produce artificial immunity against tuberculosis have been conducted for a number of years and along many lines. In 1890 Robert Koch announced the discovery of tuberculin. It was claimed at that time that by the use of tuberculin resistance to tuberculosis could be increased in such a way as to assist in withstanding infection, and also that some infections already established might under the use of tuberculin be overcome. But extensive experimentation has shown that these effects are not sufficiently uniform, lasting or powerful to be of distinct practical value.

Following this pioneer work of Koch came the work of many investigators with modified tuberculins and with extracts from tubercle bacilli made in a variety of ways. Repeated experiments with all these substances have shown that it has not been possible by their use to render animals immune to tuberculosis permanently, or to a practical degree. Experiments have been made by several investigators to test the immunising value of dead tubercle bacilli and of bacillary pulp. The results have been about the same as have followed the use of extracts from tubercle bacilli.

It became evident years ago that immunity against tuberculosis, to be of value, must confer protection against the organism of tuberculosis as well as against its toxins. There must be bacterial as well as toxic immunity. Efforts to immunise animals against living and virulent tubercle bacilli by inoculating them with living tubercle bacilli of low virulence, were made as early as 1891 by Granchez and Ledoux-Lebard. In 1892 and 1893 Trudeau† found that by inoculating rabbits subcutaneously with living cultures of avian tubercle bacilli, he was able to increase their resistance to infection from mammalian tubercle bacilli of a culture known to be virulent for rabbits. De Schweinitz,‡ in 1894, discovered that it was possible to very greatly increase the resistance of guinea-pigs to inoculations of tuberculosis by inoculating them with attenuated tubercle bacilli of human origin; the process of attenuation consisting in prolonged cultivation (twenty generations) on glycerin beef broth of acid reaction. Tubercle bacilli of human origin grown in this way lost their virulence for guinea-pigs, but guinea-pigs inoculated with this non-virulent culture developed so much resistance to tuberculosis, that when they were afterwards inoculated with tuberculous tissue from a cow they remained healthy, while other guinea-pigs inoculated with the same material from the cow died of tuber-

* From the *American Veterinary Review.*
† *New York Medical Journal*, July 23, 1893.
‡ *Medical News*, New York, December 8, 1804.

culosis in seven weeks. De Schweinitz injected very large quantities of human tubercle bacilli into cattle subcutaneously, intravenously and intraperitoneally. He found that by gradually increasing the dosage enormous quantities could be tolerated without injury. He administered as much as 500 c. c. of a heavy suspension of tubercle bacilli at one time.

McFadyean,* in 1901 and 1902, reported that he had found that the resistance of cattle to tuberculosis may be very greatly increased by the use of successive inoculations with tuberculous material or tubercle cultures of low virulence. In a paper of McFadyean's entitled "Further Experiments Regarding the Immunisation of Cattle against Tuberculosis," † the author states this conclusion:

"It appears to be justifiable to conclude that, whatever may have been the degree of natural immunity possessed by these three experimental animals, it was much increased by the successive intravenous inoculations to which they were subjected. The immunity was not absolute, but it may be doubted whether a degree of resistance that would merit that term is obtainable by any method in cattle."

von Behring announced in December, in 1901, that he was engaged in studying the immunisation of cattle against tuberculosis, and he has since issued several reports upon his work. von Behring has made a very large number of experiments in this field; he has endeavoured to produce immunity by the use of tuberculins, by the use of other tuberculosis toxins, by anti-toxins, by the use of dead tubercle bacilli, of tubercle bacilli weakened by chemical agents, and by the use of tubercle cultures of low virulence. A method for the vaccination of cattle against tuberculosis has been formulated by von Behring, and it is based on the use of tubercle bacilli of human origin that are non-virulent for cattle. In making this "vaccine" the tubercle bacilli are dried and ground to a powder. The vaccine material is sent out in this dried state. It is necessary to make a suspension of it in normal salt solution, whereupon it may be administered by intravenous injection. A number of investigators, as Lorenz, Schlegel, Eber and Hutyra, have tested the resistance of cattle treated by von Behring, or according to von Behring's method. It has been shown that the resistance of these animals to tuberculosis has, in most cases, been increased and sometimes considerably so.

It is to be observed, however, that many of the cattle reported upon by the above authors were not vaccinated according to the method that von Behring now recommends, and as Eber says: ". . . The tuberculin test is not a reliable means for determining the freedom of tuberculosis of an animal that has been treated with mild bovine or human tubercle bacilli unless a long time (generally more than a half year) has elapsed since the last administration of infectious material. . . . Since neither of the treated cattle was vaccinated by the two-vaccination method with attenuated human tubercle bacilli, according to the method now recommended by von Behring, the conclusions that are reached as a result of my investigations have only a relative bearing on an estimation of the value of the method now recommended by von Behring.

"The results of the investigations show, however, that it is possible

* *Journal of Comparative Pathology and Therapeutics*, June, 1901, and March, 1902.
† *Ibid.*, March, 1902.

to confer upon cattle, by treating them with attenuated bovine or human tubercle bacilli, a certain degree of resistance to artificial tuberculosis infection.

"Whether this resistance, as produced by the two-vaccination method, with attenuated human tubercle bacilli, that is now in use, furnishes protection against natural infection, can only be determined by years of careful observation and the greatest possible number of animals immunised in this way, and controls at the time of slaughter."

Hutyra* has reported some work conducted by him in 1903 and 1904 at the Royal Veterinary College of Hungary, wherein he tested the immunity of calves vaccinated according to von Behring's method, with material furnished by von Behring, and also with material prepared from cultures made by himself. Hutyra tested the resistance of his vaccinated animals by inoculating them with virulent bovine tubercle bacilli, and their resistance was compared to that of unvaccinated animals. He found that nearly all of the vaccinated animals had more resistance than the unvaccinated animals. One animal treated with von Behring's vaccine (No. 3) appeared to have received no immunity as a result of vaccination. Hutyra's own vaccine material from different sources appeared to give a noticeably higher degree of immunity than that obtained from von Behring's.

Recently, a large number of cattle, amounting to several thousand, have been vaccinated after the von Behring method in Germany, Austria and Hungary. The process does not appear to be free from danger in every instance, as is shown by the reports of Marks, Casper and others. It is as yet impossible to draw any conclusions whatever as to the efficacy of vaccinations from the results of this great number of vaccinations of cattle on farms. The only conclusion at which one may fairly arrive is that vaccination appears, *in most cases*, to be unattended by danger to the vaccinated animals. Whether immunity is conferred, and, if so, whether it is sufficiently powerful or lasting for practical purposes, is not yet shown by the practical application of von Behring's method. Of the animals that have been vaccinated on farms and afterwards exposed to infection, a number have been slaughtered and some have been found to be afflicted with tuberculosis, others have been found to be free from tuberculosis. The presence of lesions of tuberculosis is taken by some of von Behring's observers to mean that the animal was tubercular before it was vaccinated. Of course, this may be true. But it must be remembered that the absence of lesions of tuberculosis in vaccinated animals cannot fairly be taken to signify the existence of a serviceable degree of immunity, unless it is shown that the conditions under which these animals were kept were such as to lead to the infection of a considerable proportion of unvaccinated animals; and this evidence is in most cases lacking.

Klimmer has carried out some very useful investigations upon the immunisation of cattle against tuberculosis at the Royal Veterinary College at Dresden.† Klimmer protests againg sending out vaccine material in the dry, powdered state, on account of the great danger to the operator who attempts, in the field, to prepare this material for use. Klimmer's practice is to prepare suspensions of tubercle bacilli in the

* *Zeitschrift für Thiermedicin*, Band ix., Heft 3-4, 1905.
† *Berliner Tierarzliche Wochenschrift*, July 5, 1905.

laboratory, just as has been done for a number of years at the laboratory of the Pennsylvania State Live Stock Sanitary Board.

The vaccine material that has been prepared in Dresden appears to be harmless to the vaccinated animals, and indications thus far are that it confers a serviceable degree of immunity, but it is not yet possible to draw final conclusions from this work for the reason that the vaccinated animals are still living, and it is impossible to determine positively whether they are free from tuberculosis. Klimmer proposes the use of a vaccine material made of mammalian tubercle bacilli that have been rendered less virulent by passage through a cold-blooded animal. The advantage from such a culture would lie in the total absence of danger to the operator.

Work upon the vaccination of cattle against tuberculosis at the laboratory of the State Live Stock Sanitary Board of Pennsylvania commenced in the year 1901. It has, therefore, been under way for about five years. We were able to show three years ago* that it was possible to increase the resistance of animals to tuberculosis to a very high degree by treating them with several intravenous inoculations of non-virulent tubercle bacilli of human type. Two cattle thus treated were inoculated intratracheally with a suspension of bovine tubercle bacilli, and both of them wholly resisted the inoculation. The only lesions in either of these animals was a slight thickening upon the wall of the trachea at the place where the hypodermic needle was inserted. Two unvaccinated animals, inoculated at the same time, in the same way, with the same quantity of bovine tubercle bacilli from the same culture, became extensively infected with tuberculosis, showing the lesions on the mucous membrane of the trachea and bronchi, in the lungs, and in the bronchial, mediastinal, and post-pharyngeal lymphatic glands.

The immunity that was obtained in the case of these two animals resulted from the administration of seven intravenous injections of vaccine material during a period of ten weeks. The doses of tubercle bacilli ranged from 13 to 26 mg. While this experiment, and other similar experiments, were sufficient to lead us to the conclusion that animals may be rendered immune to tuberculosis, it was at the same time evident that a process depending upon the application of vaccine material seven different times, would be of comparatively small value in general practice. Therefore we set ourselves to the study of the effects of other methods of vaccination, and to the development of a simple and effective method. During the past three years we have attempted to determine the immunising effects of several strains of tubercle bacilli. We have administered vaccines in different doses, at long and short intervals, and with varying numbers of doses.

For these experiments we have been supplied by the State Live Stock Sanitary Board with a large number of animals. For two years we have had the use of a farm where about one hundred cattle have been kept for experimental purposes. We have also had the use of stables at the Veterinary Department of the University of Pennsylvania, where from twenty to twenty-five cattle have been kept, together with numerous goats and small laboratory animals. Through the use of the farm we have been enabled to keep a considerable number of cattle under practical farm conditions.

* *Philadelphia Medical Journal*, November 29, 1902.

During the time that they have been under observation in our experiments the resistance to tuberculosis of vaccinated animals has been tested through exposure to natural infection and by inoculation. When vaccinated animals have been exposed to infection, and when they have been inoculated, unvaccinated control animals have been equally exposed or inoculated. We regard this use of controls of the highest importance, because it is only in this way that a definite standard for comparison can be provided in order to measure the extent of resistance to a given amount of exposure. Moreover, it is only by the use of controls that one can ascertain whether exposure under natural causes has been sufficient to lead to the infection of unvaccinated animals.

It is not enough to associate vaccinated cattle with tuberculosis cattle, and then to conclude that the vaccinated cattle were immune, because, when they were killed, they did not show lesions of tuberculosis. It might readily happen that the exposure was not sufficient to lead to the infection of unvaccinated cattle; but if, upon equal exposure, we find that the unvaccinated cattle are tuberculous, and the vaccinated cattle are free from tuberculosis, then we may safely and justly conclude that the vaccinated cattle received immunity from their vaccination. Our proof is based upon such clear evidence as this, frequently repeated.

Our experiments have shown that different strains of tubercle bacilli have different immunising values. Avian tubercle bacilli may produce an intoxication resulting in great emaciation, but avian cultures do not appear to confer upon animals so much immunity as results from the use of mammalian cultures that are non-virulent for the animals upon which they are used. In order to produce artificial immunity in mammals it appears to be necessary to vaccinate with an attenuated mammalian culture.

We have not found any advantage either in respect to the degree of immunity or economy of time in the use of several vaccines made from cultures of different and progressive degrees of virulence.

The amount of immunity bears a rather definite proportion to the number of vaccinations and the amount of vaccine material used, provided, however, that the animal be not "over-vaccinated"; that is, that the vaccinations are not too close to one another, and that an excessive amount of vaccine is not administered. By over-vaccination the resistance of an animal to tuberculosis may be reduced to a point below normal, or a fatal toxæmia may be caused.

Experiments have been made wherein animals vaccinated with different doses and different numbers of doses have been inoculated at the same time, and in the same way. While the resistance of all of the vaccinated animals to the inoculation has been much greater than the resistance of unvaccinated animals, it has been possible to observe a marked difference between animals vaccinated in different ways. For example, an animal vaccinated five times has more resistance than an animal vaccinated four times, and, other conditions being equal, an animal vaccinated four times has more resistance than an animal vaccinated three times.

From the practical standpoint, it is more important to ascertain the amount of vaccination that is necessary to protect animals under customary conditions of exposure and the shortest possible time during

which a sufficient degree of immunity may be conferred, than it is to determine how great a degree of immunity may be produced.

Since it has been necessary to try a great number of different methods of vaccination, and since the time required for an experiment of this sort is much greater than is usual in experiments conducted through laboratories of hygiene, it has been difficult and time-consuming to accumulate evidence upon which to base a general method for the vaccination of cattle.

It is already clearly evident that different degrees of immunity, and serviceable degrees of immunity, may be obtained at will. Under natural conditions, animals differ in respect to their inherited or acquired resistance to tuberculosis. Conditions of exposure differ, being very much greater upon some farms and in some herds than in others. Therefore it seems to be reasonable to conclude that animals will require more artificial immunity to tuberculosis under some conditions than under others. The case is similar to the protection of cattle against anthrax by vaccination. In Pennsylvania we have found by experience, extending over a series of years, that the immunity conferred by vaccinating with the first and second vaccine of Pasteur usually is sufficient. On a few farms, however, the exposure appears to be more intense, and it is found that on such farms it is necessary to use the third vaccine of Pasteur. Experience may show that it may be necessary to vaccinate different conditions in slightly different ways.

The amount of immunity that is conferred by three vaccinations is rather high, and will probably be sufficient in most cases. Indeed, two vaccinations may supply a sufficient amount of immunity under some conditions.

The subject of the duration of immunity is very important, and is one that can be solved only by observations upon a large series of vaccinated cattle, some of which may be killed and examined *post-mortem* from time to time during a term of years. Of course it is necessary that animals kept for this purpose should constantly be exposed to infection, and vaccinated controls must be similarly exposed, and the *post-mortem* results must show that the amount of exposure was sufficient to cause the infection of the unvaccinated animals.

Our own experiments indicate that artificial immunity may endure at least two years, and there is every reason to expect that additional experiments will show that immunity will be of longer duration than this. Perhaps it may last throughout the entire life of the animal; but conclusions on this point are entirely premature.

The effect of tuberculosis vaccination upon cattle already infected with tuberculosis has also received our attention*; it has been found that intravenous injections of tubercle bacilli of human type, non-virulent for cattle, have a very marked influence not only in restraining the progress of existing lesions but also in causing them to become encapsuled and to recede. In other words, such treatment appears to have a marked curative effect on some tuberculous animals. But this statement should be accompanied by a note of warning. We do not for a moment wish to imply that it is practicable, or even possible, at this time, to cure tuberculous cattle. The observations to be made

* *University of Pennsylvania Medical Bulletin*, April, 1905. *American Veterinary Review*, 1905.

in this direction are regarded by us as of importance chiefly as tending to throw additional light on the subject of immunity. It was shown that the treatment given had the same immunising effect upon infected animals as upon healthy animals. The effect upon the immunisation in these cases was, first, to prevent the further dissemination of infection, and, second, to cause the encapsulation and elimination of the existing lesions.

It is probable that this method of treatment may prove to be of value with relation to young animals, or animals known to be but recently infected with tuberculosis. Such treatment will always have to be carried out with the most extreme care and under conditions that can be very fully controlled. It is not to be recommended for general practice.

As to the application of vaccination against tuberculosis: vaccination, properly applied, is effective, and we believe that it will prove to be of very great practical value. It is not possible on most American farms to establish a separate herd of infected cattle, and to keep the infected cattle as separate and distinct from the uninfected cattle as is necessary, if tuberculosis is to be treated according to the Bang system. The alternative, if tuberculosis is to be eradicated, is to destroy all of the animals that react to the tuberculin test. The latter plan involves a great deal of waste and loss, which heretofore has been unavoidable, and which has been amply justified because it has been less than that resulting from the continuation of the infection in the herd.

But it is important that a better, a less expensive, and, if possible, a more effective method shall be devised. It appears to be highly probable that vaccination may supply this method. It is admittedly impossible to test with tuberculin all of the tuberculous herds of a state. Therefore, it is not possible to discover and to either destroy or sequester all of the cattle that may be distributers of tuberculosis. Herds freed from tuberculosis by the use of the tuberculin test are always exposed to reinfection, and must be guarded by the double testing of all recruits and by systematic reinspections of the herd. All of this may be, and is, carried through successfully, and should be practiced to a much greater extent than it is, unless an equally effective and cheaper method can be devised.

It will be a great step in advance to be able, not only to discover that an animal is free from tuberculosis, but also to render that animal permanently immune to infection. It will be a great advantage to be able so to treat young cattle that they may resist tuberculosis even though they are continually exposed. The advantage to the breeder of being able, not only to grow a herd free from tuberculosis, but immune to tuberculosis, will be very great. We believe that all of this may be looked forward to; but until more experiments and observations are completed, vaccination should be applied only under such conditions as will permit exact observations to be made, and each vaccination must, for the present, be regarded as a scientific experiment.

Clinical Articles.

FRACTURES OF THE CERVICAL SPINE IN ANIMALS.

BY EDRED M. CORNER, B.SC.(LOND.), M.A., M.B., B.C.(CANTAB), F.R.C.S.(ENG.), SURGEON TO OUT-PATIENTS, ST. THOMAS'S HOSPITAL, AND TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET; CONSULTING SURGEON TO THE WOOD GREEN HOSPITAL.

In the *Veterinarian* of 1899 I published a series of articles on "Fractures and Dislocations in Animals." The paper on the vertebral column began with this sentence: "Fractures and dislocations of the vertebral column are of necessity very frequently fatal." In 1906 there is reason to modify that statement in degree.

In the same paper it is stated that: "The first point noticed is that only the first four cervical vertebræ have been recorded as fractured; and of these, the third is by far the most commonly broken. The only case of pure fracture which has been recorded picks out the third vertebra again. Dislocation occurs most frequently about the second and third vertebræ. The cases given by Müller in his text-book, though not definitely stating the true nature of the injuries, have most commonly suffered injury in the first four vertebræ (seven out of eight) and the vertebræ most commonly injured are the second and third (four out of eight cases). Hence it may be safely said that these vertebræ, especially the third, are the ones most frequently damaged."

From this abstract it would appear that fractures of the upper cervical spine are the chief ones in animals, corresponding to those about the level of the fifth and sixth cervical vertebræ which are the most frequent in man; they occur so low down in the latter on account of the spinal changes due to his specialisation for the erect attitude. The situation of fractures of the cervical spine shows a marked difference in man and animals; the most frequently broken vertebræ in man being the fifth and sixth, and in animals the third. In the six to seven years which have elapsed since the publication of my paper in the *Veterinarian*, nothing has been published to modify the above views. But some striking cases have come to my knowledge which indicate that fractures of the first vertebra, the atlas, may heal, *leaving only a stiffness of the neck as an indication of their previous presence.* Thus, in animals, it is to fractures of the atlas that future investigators must look for non-fatal and obscure lesions of the spine; just as in man I have urged that such corresponding and similar lesions will be found chiefly in the axis.* So it seems likely that the upper cervical spine will provide the least fatal and most easily missed and unnoticed fractures of the spines of vertebrates.

The axis, the second vertebra, does not seem to suffer as often as does the atlas in animals. This is to be expected from the relative importance of the bones in them. In man, with the erect attitude and extensive horizontal (rotatory) movements of the head, the axis has more important functions than the atlas. In animals, the atlas is the important link between the more rigid spine and the skull, the axis merely being a somewhat specialised cervical vertebra. Hence

* *American Journal of Medical Science, 1906; Annals of Surgery, 1906, &c.*

the incidence of fracture in the two classes upon the relatively more important bone.

Two examples will be quoted to show that lesions of the atlas are not necessarily fatal. In the first instance a slight muscular action produced a fatal displacement of the fragments. The specimen is labelled 2021A in the Museum of the Royal College of Surgeons, Lincoln's Inn Fields. It consists of the atlas and axis vertebræ of a tiger, which show an imperfectly united fracture which traverses the anterior and posterior laminæ of the atlas. "The fracture had probably resulted from an injury some time before death."* In this example the fracture produced no symptoms, and was only discovered because by chance the fragments were displaced later, causing the death of the animal.

The second instance is recorded by Dale in the VETERINARY JOURNAL, 1903, viii., p. 72. A foal, six months old, was galloping in a field when his head came in contact with a tree. He was knocked backwards some yards and lay as if dead for a few minutes. He then got up and went into his box. Mr. Dale remarked that "he appeared as well as ever, sucked and played about, his action being quite natural." The diagnosis of fracture of the atlas was arrived at on account of the broadening of the neck in this region. A week later, as the foal became unable to suck and walked "as if on parade," he was destroyed. A *post-mortem* examination confirmed the diagnosis that the "body of the atlas was split right through" and showed also the presence of an organising clot.

It is not quite clear why these symptoms, inability to suck, &c., came on. The clot had already been present for a week, so that they cannot have been produced by pressure, but were due to myelitis inflammation of the spinal cord. Otherwise there were no symptoms, the foal playing about as usual in spite of the fracture and the clot.

These two cases show that the advance in our knowledge of spinal fractures in the last six or seven years of veterinary work has been made in the direction of showing that fractures of the atlas need not produce gross symptoms and need not be fatal. Veterinary surgery is in complete accord with human, as has been shown elsewhere, in that injuries of the cervical spine need cause nothing more than a temporary stiffness of the neck, and can be more easily overlooked than any other spinal injury.

Fractures and dislocations, as a rule, depreciate the value of an animal, which in consequence is destroyed. Fractures of the cervical spine will, however, provide exceptions to this rule. It is therefore incumbent upon veterinary surgeons to recognise their presence, and to treat the neck accordingly with splints, plaster bandages, &c., followed by massage. Both of the above recorded cases show the penalty which may be exacted if the injury is not treated adequately. It is for this reason that I have asked the Editor for space to publish my communication.

37, Harley Street, W.

* Quoted from the Descriptive Catalogue.

NOTES ON AN OUTBREAK OF ANTHRAX.

BY LIEUT. T. A. NICHOLAS, ARMY VETERINARY DEPARTMENT, BANGALORE, INDIA.

THE following notes were made during an outbreak of anthrax occurring in June last amongst the horses in the 12th Battery of the Royal Field Artillery.

CASE 1.—On June 3 horse No. 200 was admitted into hospital about midday with a temperature of 102·2° and showing the usual symptoms of bilious fever. At 5 p.m. on the same day a slight swelling was noticed about the throat, and the animal was at once isolated as being suspicious of anthrax. On the following day the swelling of the throat was larger and the temperature 103°, the animal having lost its appetite. There was a yellow gelatinous discharge from the off nostril; the respirations were a little laboured, and the horse looked depressed.

During the 5th the horse had a temperature of 103°; there was complete loss of appetite, great depression, and a tendency to wander round the box. Death occurred at 6 p.m. Just before death there was a peculiar quivering of the muscles of the shoulders, particularly on the off side.

Microscopical examination of the blood revealed anthrax bacilli in large numbers.

CASE 2.—The horse was admitted into hospital on June 6 at 6 a.m., with a temperature of 106·2°. The animal had been observed to be breathing heavily when at the riding school, and upon admission into hospital was at once isolated. At 12, noon, a slight yellow gelatinous discharge was observed from the off nostril, but the patient was feeding well and the temperature had gone down to 105·2°. On the following day the temperature varied between 105° and 106°, the horse fed a little, and there was a slight swelling of the throat on the near side.

During the 8th.—The temperature was now 104·4°, and the swelling had extended towards the near nostril. The appetite was capricious, and the horse would eat hay and lucerne, but would not touch bran. The respirations were slightly hurried.

June 9.—The temperature at 6 a.m. was 105°; there was a yellow gelatinous discharge from both nostrils, and frothing at the mouth. The swelling was increasing, and at 5 p.m. there was complete loss of appetite, with the temperature 106°. On the following day the temperature varied between 103-104°; there was a large swelling in the throat, the laboured breathing could be heard quite one hundred yards away; there was a yellow, gelatinous, blood-stained discharge from both nostrils, and from the nasal canthus end of each eye. Death occurred at 3 p.m.

CASE 3.—The horse was admitted into hospital on June 13 at midday with a temperature of 104·2°; although feeding well and not showing much depression, it was treated as suspicious of anthrax and at once isolated.

At 5 p.m. on the same day the temperature had risen to 106·4°.

During the 14th the temperature was 104°; the appetite capricious, and there was slight depression and perceptible increase of respiration.

Two small swellings were noticed, each about the size of a hen's egg, on the lower extremities of the last two ribs on the off side. At

noon on the same day the temperature was 105°, and beyond eating a little lucerne the horse could not be induced to take anything. At 3.30 p.m. the temperature was 103·2°, and at 4.15 p.m. 101·4°. The ears and legs were now cold and the body covered with patches of sweat, and the horse was walking round the box and showing signs of abdominal pain.

About 5 p.m. the animal commenced to stagger and eventually fell down, respiration ceasing abont ten minutes later. Before death there was a similar peculiar quivering of the muscles of the shoulders on the off side, as already mentioned in Case 1.

Microscopical examination revealed numerous anthrax bacilli, the blood itself being of the usual character, black and tarry. Each case came from the same battery, but from different sections.

OVARO-HYSTERECTOMY OF THE PREGNANT UTERUS.

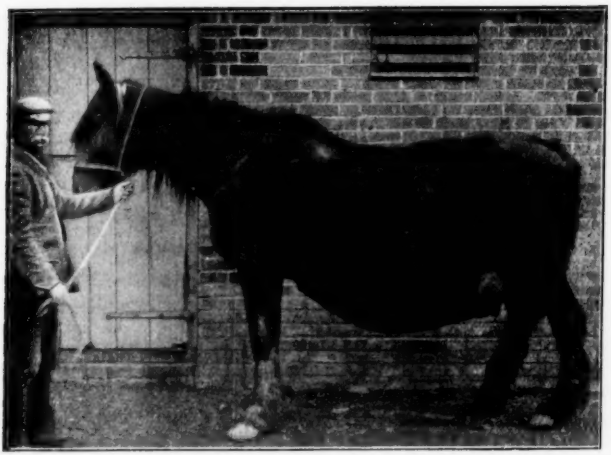
BY H. HOLROYD, M.R.C.V.S., BLACKBURN.

At 9 p.m., April 3, 1905, I was called to see a bull bitch unable to pass her puppies. She was an undersized prize-bred animal, and had given birth to two living puppies early in the morning; she had been straining hard since but to no purpose. On examination I could feel the ribs and a fore-leg of a fœtus, the head appeared to be turned back. After a fruitless trial, the leg coming away in the meantime, I came to the conclusion that delivery by the natural passage was out of the question. She was a great pet and the owner wished to save her if at all possible. She was chloroformed, and chinosol was the antiseptic used. An incision 2 inches in length was made into the abdominal cavity; this was found to be far too small and was enlarged to about 4 inches; the uterus was then quite exposed. I passed a double ligature (gut) around it a little in front of the fœtus, and then cut it away three-quarters of an inch behind the ligature; the cavity of the remaining portion was washed out and sutured together. A ligature was applied above each ovary, and the uterus, containing three puppies, removed. At this stage the gut suture material ran out, and the internal abdominal wound was sutured with string which had been soaked in a solution of chinosol; the skin also being sewn up in a like manner. The animal was fed entirely on milk and water for the first three days; on the fourth day she refused food, and seemed very dull. On the following day, however, she was quite lively again and would eat anything; she was allowed a more varied diet. I kept her three or four weeks; she made a perfect recovery. I may say the abdominal wall sutures were removed about ten days after operation.

AN INTERESTING CASE OF VENTRAL HERNIA IN A MARE.

BY W. J. TURTILL, V.S., ASHBOCKING.

THE photograph below illustrates rather an interesting ventral hernia to which I was called in April, 1903. On the 6th of the month I was requested to send medicine for a mare, said by the owners to be suffering from "farcy of the body," which is the term used in this district for œdema. On the following day I saw the animal, and found that she had a large œdematous swelling extending from the ensiform cartilage of the sterum up into the left flank. It was about six inches across, and looked very much like a rolled-up blanket. I endeavoured as far as possible to apply an equable pressure upon it by means of bandages but gave an unfavourable prognosis, as it was difficult to keep them in position. The photograph was taken on April 9th. The mare was heavily pregnant, and the foal could be seen distinctly moving about inside the swelling.



She died soon after the photograph was taken, and upon making a *post-mortem* I found that the uterus had been ruptured. The rent in the muscles and peritoneum was nearly two feet in length.

A CASE OF OVARY-HYSTERECTOMY IN THE SOW.

BY H. A. YOUNG, M.R.C.V.S., DUNMOW.

I WAS called one day in March last to a sow in difficult labour. The animal was four years old, and, owing to an injury of the pelvis caused by the kick of a horse in the previous year, was very much malformed

in the hind-quarters—in fact, I found it impossible even to explore with two fingers, and to remove fœtuses was absolutely out of the question.

The latter were perfectly putrid, and I found upon enquiry that the sow had been attempting to farrow for the past three days.

Having obtained the consent of the owner, I determined to attempt Cæsarean section, but at a later stage of the proceedings altered this into an ovaro-hysterectomy. Throwing her on her right side I shaved and thoroughly cleansed the skin of the left flank, using ether soap and plenty of disinfectant. The sow was then placed under the influence of chloroform applied on cotton-wool by means of a bag, and I opened the abdomen by means of an incision in the flank two inches below the point of the ilium. I withdrew the pregnant uterus, and placed catgut ligatures around the body and above each ovary; the whole uterus and contents were then removed with a scalpel, the muscles were sutured with catgut, and the skin, separately, with silk; the whole being covered up with a pad of boric wool and a bandage. Everything in the way of instruments and the cloth upon which the uterus was laid was carefully boiled, and the strictest attention paid to antiseptic precautions. The wound healed in three days, and the animal never gave the slightest anxiety. She was sold fat for £5 10s. three months afterwards.

FOUR CASES OF UNCOMPLICATED DISLOCATION OF THE HIP-JOINT IN CATTLE.

BY H. HOLROYD, M.R.C.V.S., BLACKBURN.

No. 1 was a blue roan heifer; the owner informed me she had been in her present state about ten days, being left all right one evening and found lame the following morning. When I saw her she was lying on her left side, and I noticed that the right hind leg was pushed forward in a very unnatural position. When she was made to rise, the limb was quite useless, being held somewhat rigidly, poked forward and outward. There was a well-marked depression, about the size and depth of a small tea saucer, slightly below the hip joint. After standing for a few minutes the animal lay down, when the three sound legs were secured. She was pushed over on to her side, and her head held securely. I next procured a rounded piece of timber, some three or four feet long, and as thick as a man's arm. This was placed inside the leg, well up between the udder and the thigh. A rope was attached to each end of this pole and held by two men. Another rope was tied to the leg above the fetlock joint. A couple of men then pulled steadily on this while I held my hand over the region of the hip-joint, and both felt the jerk and heard the "cluck" as the head of the femur slipped into the acetabulum. The animal was allowed to rise, and could then use her leg fairly well, but some lameness remained for over a week in this case—probably on account of the length of time which had elapsed between the injury and reduction.

No 2 was a roan heifer, left all right in the evening and found wrong the next morning. The owner at once called me in. She, too, was lying down. When made to get up, I noticed exactly the same symptoms as in No. 1, with the exception of the depression over the hip, which in this case was only slightly noticeable. Reduction was effected as in the first case, not nearly so much traction being required. When she regained her feet she was practically all right. I applied a blister to the hip, tied up her head, and placed a box under her, to keep her on her feet for a few hours.

No. 3, a cow, had wandered into a flower garden, and whilst being chased out by a boy, jumped over the boundary wall. With great difficulty she was persuaded to stand on her feet and taken into a barn close by. On my arrival, two hours after the accident, I found her lying down. Again with difficulty she was made to rise, when I observed the same characteristic symptoms as in the previous cases. She was a big, heavy cow, and we had some difficulty in keeping her up for examination. She was secured, and treated as before described. After getting up she walked, almost sound, to her stall. When I saw her again, three days afterwards, she was all right.

No. 4, a heifer, was being turned out to water, when she slipped or fell in the doorway. I saw her about an hour after the accident. She was lying on her left side with the right leg pushed outwards. We got her up with some difficulty, and she showed the same symptoms as the other three patients had done, although the depression over the hip was very faintly noticeable. In addition she made continual attempts to put weight on the limb, but she had no power to grip the ground, as the foot slipped forward and outward at each attempt. The treatment was the same as in the other cases. This animal, however, did not lie down within a reasonable time, so I had to force her to do so. Some slight lameness remained, immediately after reduction, but when I called three days after, she was all right.

In each of the above cases it was the right hip that was dislocated. I suppose this fact can only be called a coincidence. With the exception of Case 1, reduction was quite easily effected, the sudden jerk being very noticeable as the head of the femur found the cotyloid cavity. The good results were immediately manifest, and the sequel in each instance very satisfactory.

CYSTIC CALCULUS IN A GELDING; OPERATION, RECOVERY.

BY WM. DAWSON, M.R.C.V.S., CAVAN, AND J. F. CRAIG, M.A., M.R.C.V.S., PROFESSOR IN THE ROYAL VETERINARY COLLEGE OF IRELAND.

CALCULI in the urinary tract of the horse are not to be met with daily in practice, and the clinical descriptions of such cases are not very frequent in veterinary literature. It would, therefore, not be out of place or free from interest to give an account of a case of calculus occurring recently in a gelding. Urinary calculi in the horse may

develop in any part of the urinary apparatus. They are to be found in the pelvis of the kidney, but there, in the horse at any rate, the detection of them only occurs on *post-mortem* examination. These bodies also form in the course of the urethra, and have been discovered there by clinical observation and by manipulation, and removed successfully by operation. Most of the cases of urinary calculi in the horse, however, which are clinically diagnosed and operated upon, are formed in the urinary bladder. The case of urinary calculus about to be described is one in which the calculus was found in the bladder, and the animal was the subject of a successful operation for its removal.

Subject.—The subject of the calculus was a valuable hunter gelding, aged 8, in good, hard condition.

History and Symptoms.—For the two months previous to examination by Mr. Dawson, the animal was observed after exercise or handling to pass a considerable quantity of blood-stained urine. This was the chief symptom observable in this case. A rectal exploration was made, and a hard body, considered to be a calculus, was felt towards the posterior extremity of the urinary bladder. This body could be rotated to a slight extent within the bladder by manipulation through the rectum. To examine the calculus it was only necessary to insert the hand as far as the wrist into the rectum.

Mr. Dawson, when he first diagnosed the case on November 14, 1904, described the calculus as a flat, hard body, about 3½ inches long by 2½ inches broad, and about 1 inch thick. As was afterwards shown, the description of the calculus was fairly accurate.

An operation for the removal of the calculus was recommended by the veterinary surgeon and decided on by the client. Mr. Dawson asked me to come through to Cavan for the operation, which was arranged for Saturday, December 3, 1904.

Operation.

Preparation of Instruments.—The instruments prepared for the operation included a scalpel, a pair of dressing forceps, a pair of Spencer Wells' artery forceps, needles and silk, Professor Axe's lithotomy forceps, lithotrite and urethral dilator, a lithotomy scoop and steel sound. These were all boiled in water for fifteen minutes on the morning of the operation, and kept afterwards in a clean dish filled with 2½ per cent. carbolic lotion. A horse catheter was washed in creolin solution and anointed with antiseptic vaseline. Linen cloths, which were used instead of sponges, were previously boiled. The lubricant employed in the operation was linseed oil, which had been submitted to the temperature of boiling water for about half an hour. Two clean buckets were filled with creolin solution, one for use in the preparation of operation area, the other for use during the operation.

Preparation of the Animal.—The gelding had, for a few days' previously, been kept short of food. It was ridden in from home only the day before to the veterinary surgeon's premises, a distance of about seven miles. Nothing in the way of food was offered to the animal on the morning of operation.

The place chosen for the operation was a roomy loose box, which was well lighted and bedded and the floor of which had been disinfected.

Here, about 11.30 a.m., the gelding was put down with hobbles on its off-side. Chloroform was administered as an anæsthetic, with Cox's muzzle. Three ounces of chloroform were required to produce unconsciousness, and seven ounces of the anæsthetic altogether were used for the operation. The animal took the anæsthetic very well. After anæsthesia was produced, the perineum of the gelding was washed and scrubbed with soft soap, and the area douched with the creolin solution. The catheter was passed and kept in this position. The tail of the animal was kept out of the way by means of a rope. My hands were then well washed and antisepticised.

An incision was next made with the scalpel along the middle line of the perineum, beginning immediately underneath the bulb of the anus and extending thence for a distance of about 3 inches. This incision was carried through the skin, the two layers of subjacent fasciæ, then the retractor penis muscle and corpus spongiosum, until the urethra containing the catheter was reached. The rod-like bulging of the catheter gave a good indication as to the position of the urethra. As the animal was lying on its off-side, the urethra was slightly displaced from the middle line in that direction, and allowances for this displacement had accordingly to be made in the incision. Care was taken that the outer opening of the incision should be larger than the opening made in the urethral wall. After the urethra was opened, the catheter was withdrawn and a steel sound passed through the opening into the intra-pelvic urethra and thence into the bladder. It grated at once against the surface of the calculus. I then smeared one hand well with the sterilised oil and tried to pass some of the fingers of that hand into the intra-pelvic urethra. At first I was only able to insert two of my fingers, but with them could readily manipulate the stone. I then tried to dilate the tube with those fingers which I had inserted, and managed to do so to such an extent that I could pass four fingers of the one hand into the urethra. At the same time I was not able to obtain a proper hold of the calculus to remove it from the bladder. My efforts in this direction were assisted by the other hand, which was passed into the rectum and attempted to push the calculus backwards in the urethra, but even although the surfaces of the calculus and the urethra were well lubricated with oil, the mulberry surface of that body resisted all attempts to direct it in this way through the urethra. The hand in the rectum was therefore removed and again washed in the antiseptic solution.

I next tried the lithotomy forceps, after oiling them, but was unable to manipulate them very freely in the bladder, being uncertain whether a portion of the wall of the bladder would be included between the jaws of the forceps if I should grip the calculus.

The lithotrite was next resorted to. Here, again, the calculus was so large that the jaws of the lithotrite could not grip it properly. This instrument was therefore set on one side.

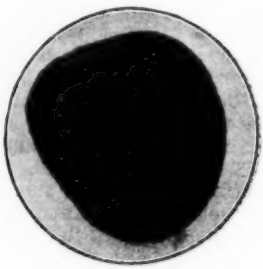
The urethral dilator was also lubricated with sterilised oil and passed through the urethral incision, and an attempt made to dilate the intra-pelvic urethra more fully than had formerly been done with the fingers. This latter attempt also proved a failure.

The only next procedure open to us in the operation was to incise the intrapelvic urethra in order to increase its calibre. It was found that the membranous portion was the most constricted portion

of the intrapelvic urethra, and the part that gave rise to the difficulty experienced in the removal of the calculus. A careful incision was therefore made along the roof of this portion of the urethra. Two fingers of one hand were placed in the intra-pelvic urethra, along the roof of the tube, one on either side of the middle line, and the blade of the scalpel cautiously inserted between these two fingers with the cutting edge towards the roof of the urethra. The roof of the urethra was incised as the knife was being withdrawn.

This one incision allowed of the dilatation of the tube to such an extent that the whole hand was admitted into the urinary bladder.

I was thus able to obtain a good, firm grasp of the calculus and remove it from the bladder.



The calculus after removal.

At this stage of the operation the chloroform muzzle was removed. The external urethral wound was then washed with carbolic lotion and any bleeding which occurred over this area was stopped. I next proceeded to stitch up the wound, although this plan is not always recommended. However, in this case, the wound appeared too large to leave open, and it was thought we might be able to have at least some portion of the wound healing by first intention. In doing so I did not insert any sutures into the urethral wall: (1) because the urethral wall was so deeply seated that it would require specially curved needles to effect that suturing satisfactorily, and (2) because I thought the sutures might unnecessarily damage some portions of the urethral mucous membrane, and be therefore more likely to lead to stricture. On that account I united together the lips of the wound in the fasciæ by a single row of interrupted sutures, and closed the skin wound in a similar way.

After this the animal was turned over on to its near side and left down for half an hour after the operation was completed in order to permit of recovery from the action of the anæsthetic. Then the hobbles were removed and the horse was allowed to rise. It was well dried and clothed, and the bedding of the loose box made comfortable for it. Food was not given until evening, when the patient received a little bran mash and some hay and water, which it readily accepted.

Appearance of Calculus.—The cystic calculus was mulberry in character, very hard and dense, and somewhat heart-shaped. It was $9\frac{1}{2}$ ounces in weight, 3 inches broad, $3\frac{1}{4}$ inches long, and $1\frac{5}{8}$ inches

thick; its borders were rounded. The accompanying photograph indicates the appearance of the calculus as it is seen from the side.

Subsequent History of the Case.—The animal for the first two weeks, was fed with mashes, hay and water. The external wound was only once daily washed with creolin solution. Only twice after the operation did any urine pass through the operation wound, and on these occasions only to a very slight extent.

Up to December 7 no abnormal symptoms appeared; no swelling, no discharge, and the urine remained normal. On December 13 the report was that the horse was going on well. Most of the outer stitches have given way; the wound is healthy and shallow; very slight discharge appears. There was practically no swelling, the temperature never above normal and the animal feeding well.

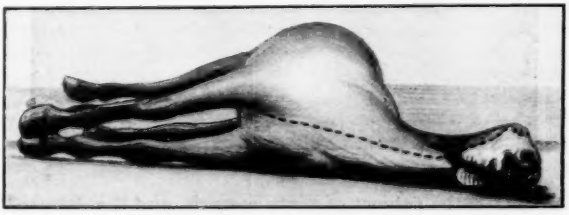
On December 17 the wound had almost closed up and the horse was ready to go home. Mr. Dawson says that there is nothing to record in the whole case more than if it had been a simple skin cut.

Later the animal was sent home, and after a short rest, appeared again in the hunting field in the early part of this year. Since then it has been occasionally inspected and up to the present the gelding retains the best of health. No evidence of stricture has as yet been noticed.

DEATH FROM LIGHTNING.

BY A. LEANING, LIEUTENANT A.V.D., REMOUNT DEPÔT, MOOI RIVER, NATAL.

THE case in question, a cavalry remount that had been out grazing along with some other horses, was brought up into a kraal as a thunder-storm was approaching, and, as is common in this country, this proved to be one of great violence. During the height of the storm, as a man was passing by the kraal, there was a simultaneous discharge of both lightning and thunder of such violence that for a few minutes he was dazed. When he recovered he saw the horse down on the ground, and on examining him found he was dead.



The dotted line shows the direction taken by the lightning (photograph).

A *post mortem* was made thirteen hours after death. The lightning had left a mark down the off side of the head and neck and inside the fore-arm, over which the hair was singed, and on removing the skin

there was a dark congested line corresponding with the external mark. The blood was thick and tarry in consistency, particularly in the heart cavities, and the substance of the heart soft and flabby; otherwise nothing abnormal was seen on *post-mortem* examination.

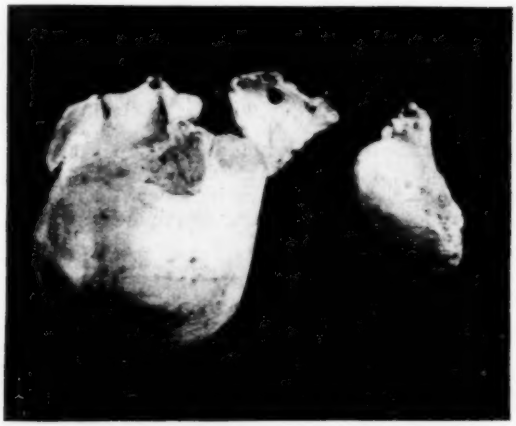
A photograph was taken at the time, and the dotted line shows well the direction taken by the lightning.

AN ENLARGED AND CYSTIC OVARY IN A MARE.

BY FREDERICK HOBDAY, F.R.C.V.S., KENSINGTON.

CIRRHOTIC and cystic ovaries are not uncommonly a cause of nymphomania in mares, but it is quite unusual to find cysts of much larger size than a walnut. In the instance recorded here the right ovary was fully as large as a large-sized cocoanut, having one enormously large cyst in it, and weighing 1 pound 14 ounces. This cyst contained about 10 ounces of clear, straw-coloured fluid, and had the operation of ovariotomy been attempted, it would have been impossible to have passed the ecraseur chain over it without first allowing the contents to escape. That this procedure, on antiseptic grounds, need give rise to no anxiety, has been already demonstrated by a case recorded in a small work which I published in 1903.

The left ovary was cirrhotic and weighed $3\frac{1}{2}$ ounces. The patient



was a cart mare, the subject of acute metritis, and the diseased ovaries were obtained on *post mortem*. She was in good working condition, and had never had any trouble which could be attributed to the ovarian disease. She was taken ill with violent abdominal pain on December 7, and died on the 9th.

* "The Castration of Cryptorchid Horses and the Ovariotomy of Troublesome Mares." Pages 84 and 103.

THE CHICAGO STOCKYARDS.*

ENERGETIC ACTION OF THE LOCAL AUTHORITIES.—GREAT SEIZURES OF DISEASED MEAT.

THERE has been a great awakening at Chicago in regard to the abominations perpetrated at the notorious union stockyards. In these columns energetic protests have been made against the fact that the United States meat inspectors have to examine for trichinæ all the hogs' flesh that is exported from Chicago to Austria, Germany, Denmark and France, but that the hogs' flesh exported to Great Britain or consumed in the United States is not so examined and guaranteed. As it is found among the hogs examined that, on an average, 1½ per cent. are infected with trichinæ, the question naturally arose why the Americans and the British consent to consume this dangerous parasite. It would appear that now, however, the inhabitants of the city of Chicago have awakened to some sense of the risks and dangers created by the staple industry established in their midst. Of course, each city has the right to take what measures it deems necessary to inspect and to control its own food supply. At the stockyards there always have been some meat inspectors appointed by the city of Chicago, but little was heard of them. They were obviously utterly unable to cope with the task before them, and when it is impossible to do a thing properly there is a strong temptation to leave it alone altogether. In any case, the sanitary services of the city of Chicago have always been starved. The following few figures eloquently set forth this fact. Thus the city of New York paid its municipal employees salaries amounting in 1903 to 52,364,272 dols., and of this sum 751,533 dols. went to the health department. During the same year the municipal salaries at Philadelphia amounted to 10,793,710 dols., and at Boston to 10,095,639 dols. The amounts that in each city went to the health departments were 154,306 dols. and 101,352 dols. respectively. But at Chicago, while 14,791,002 dols. were paid in salaries, only 46,901 dols. were paid to the health department. As the commissioner of health of Chicago points out, upwards of 14 per cent. of the total salaries are appropriated for the health department of New York and Philadelphia and more than 9 per cent. at Boston. But at Chicago the expenditure devoted to this all-important and life-saving service only amounts to 3·1 per cent. of the whole. Though with this small sum very excellent work has been done, it is not surprising that many important matters have been neglected. Why the stockyards should have been numbered among the latter must be left for local economists and politicians to explain.

For the moment it must suffice to congratulate the city sanitary authorities on the recent appointment of six new meat inspectors and the far more energetic measures that are now enforced.

At the stockyards, where more than 15,000,000 animals of different sorts, from poultry to bulls, are killed during the course of the year, the interests of the meat consumers of Chicago were only represented by two inspectors. These two individuals were supposed to look after such portion of the meat prepared at the stockyards as was intended

* Abstracted from the report of the Special Sanitary Commissioner of the *Lancet* by permission of the Editors.

for consumption within the boundaries of the city of Chicago. Evidently, as mentioned above, this duty has been grossly neglected. Whether it be that the Government of the United States, having commenced a series of actions against the Beef Trust, has caused the local authority of Chicago to pluck up its courage, in any case, and apparently for the first time, the two city meat inspectors have been unmuzzled and let loose into the stockyards. As a result the following naïve admission appears in the health department's bulletin of September 23 last: "More recently the union stockyards and neighbouring slaughter and packing-houses have received attention." The "more recently" is a beautifully guileless expression to use in the face of the bitter and fierce struggles that have taken place in regard to these stockyards. In view of their dramatic history the following continuation of the report will be read with the deepest interest and amazement: "During the last two weeks the two inspectors at the stockyards—the entire available force for this work—have condemned and destroyed 242 cattle, 503 hogs, 31 sheep, and 9 calves, being a total of 202,901 pounds of meat unfit for human food, but ready to be offered for sale to the citizens of Chicago." Here it must be noted that but for this newly-found energy on the part of only two inspectors, the inhabitants of Chicago would undoubtedly have eaten in the course of a fortnight some 200,000 pounds of diseased meat. It seems that when I ventured to denounce the condition of the stockyards and the industry there carried on as a public danger and a disgrace to civilisation, I did not exceed the limits of legitimate criticism. The meat was condemned because the animals were suffering from tuberculosis, pneumonia, "lumpy jaw," Texas fever, jaundice, necrosis, cholera, pleurisy, uræmia and anæmia, emaciation, asphyxiation, bruises, killed by trampling, &c. It would seem as if the two city meat inspectors, in their newly-awakened zeal, had shown more perspicacity than the Government inspectors who are appointed by the central authorities at Washington, and whose special mission it is to protect those foreign and European Governments which have legislated against the importation of trichinæ from Chicago. In any case, the report says, speaking of the condemned meat:—

"Among these animals were six cattle that had been passed by the Government inspectors. Two cattle were found last week by the Department inspectors that had been passed by the Government inspectors after the evidences of tuberculosis had been trimmed out. The city inspectors destroyed these cattle. The Government inspectors refused to allow the city meat inspectors to remove glands and other organs suspected of being diseased for the purpose of microscopic examination by the laboratory bacteriologists."

Then comes this startling statement that, while during the week ending September 23, 1905, the city inspectors condemned at the Chicago stockyards no less than 173,769 pounds of meat, they had condemned during the corresponding week of the previous year only 2,002 pounds. This indicates in what a perfunctory manner the work of inspection was done but a short time ago. Dr. Whalen, alluding to these statistics, says: "The above figures show the quality of the food supplies generally to be not only discreditable but positively dangerous."

By October 14 we hear of four meat inspectors being at work, and

in one week they condemned 131,954 pounds of meat, including 115 cattle and 428 hogs, together with 5,576 pounds of dressed meats, sour hams, bacon, &c. This was 53 per cent. more than three inspectors had been able to discover and condemn the week previously. Seven diseased carcases of tuberculous cattle were discovered, with evidences of the disease cut away, in the "coolers," after having been passed by Government inspectors. By October 28 six new meat inspectors had been appointed by the city authorities, and they destroyed in the one week 496 animals, weighing 145,343 pounds. Again five cattle were found in the "coolers" with the evidences of tuberculosis cut away from them. By the month of November it was found that since August 7, when the present service had been established, the average weekly condemnation of meat as unfit for food was equal to 137,300 pounds. If this average is maintained it will make an aggregate of 7,141,316 pounds in a year. As a result, circulars have now been sent out calling upon farmers and cattle-breeders to be more careful as to the conditions of the animals which they send, and hopes are entertained that "Chicago has ceased to be a dumping ground for unfit food." By December 1 it had been estimated that since August 7 the Chicago city inspectors had seized and destroyed 2,391,719 pounds of meat and fish, and 389,478 pounds of fruit and vegetables. The authorities conclude that this means that the housewives of Chicago have been prevented from spending £47,722 in the purchase of food "the consumption of which would have injured health and spread tuberculosis, trichiniasis, and other diseases." On November 4 a report states that the principal causes of the condemnation of meat was in 85 per cent. for tuberculosis, in 12 per cent. for actinomycosis, or "lumpy jaw," and in 4 per cent. for hog cholera. The report adds: "Many nuisances which, owing to the inadequate force, could not heretofore be abated, will now receive prompt attention." This, so far as it goes, is highly satisfactory, and it is something to know that a check has been exercised over the reckless proceeding that prevailed in the stockyards. Nevertheless, there remains the fundamental fact that the entire system of slaughtering is defective from beginning to end. It is grossly inhuman, because no effort is made to mitigate the apprehension and torture of the animals. It is absolutely insanitary and dangerous, because there are no slaughter-houses or abattoirs in the technical sense of the term, and therefore the wholesome meats are exposed to the risk of contamination throughout the whole process of their preparation. This risk will be somewhat reduced by the fact that that portion of the meat which, though diseased, is intended to be sold to the inhabitants of Chicago is now more likely to be seized and destroyed. But what about the rest? There is but one remedy that will be really effective throughout—the building of a public abattoir and the compulsory closure of all private slaughter-houses.

LONDON'S IMPURE MILK.

"GROSSEST CARELESSNESS."

DR. W. COLLINGRIDGE, Medical Officer of Health for the City of London, is still continuing his crusade against the sale of impure milk. In his latest report he records that in August samples from farms in twenty-two counties of milk intended for use in London were sent to Dr. Klein for bacteriological examination, who has now supplied the following summary of results :—

Character of Milk.	No. of Samples.	Percentage.
Clean and pure milk	15 ...	68
Unclean milk	5 ...	23
Bacillus tuberculosis	2 ...	9
Total	22 ...	100

"These results," the report states, "are sufficiently striking, and clearly point to the grossest carelessness, amounting, in fact, to criminal negligence, in dealing with so important an article of food. One-third of the samples taken were unfit for use, while 9 per cent. were infected with the tubercle bacillus." The two samples which were infected with tuberculosis were "derived from dairy companies supplying a large number of companies." Further investigations were pursued. On one farm a diseased cow was discovered, and Dr. Collingridge was informed "that the cow was isolated, and was being fattened for slaughter." This statement was sent to the local medical officer in view of its bearing on the local food supply. The milk from the farm was afterwards found to be normal, with no tubercle, but Dr. Collingridge adds: "The result is satisfactory as showing the existence of tuberculosis on the farm, and its removal, but from any other point of view most unsatisfactory. There is no evidence to show any systematic inspection of the farms supplying this company, and no veterinary examination of the cows." In the second case "the dairy company stated that they obtained this milk from an association of farmers in Dorset, and that they were, therefore, unable to locate the exact farm of origin. The manager of the association, however, in an interview, after admitting that the farms were not subject to any sanitary supervision, was convinced as to its necessity, and promised to bring the matter before the directors." This reform has since been carried out, and Dr. Collingridge points out that "this action is worthy of note, as showing the willingness of practical men to co-operate in this valuable work," and as a marked contrast to "the short-sighted policy" of one dairy company. Evidence was, however, produced, tending to show that the disease germs were not derived from the cows, but must have obtained access to the milk from some other source. "There are many ways in which such infection might have been conveyed, as, for instance, from the milkers or those in attendance on the cows, or even in the course of transit."

Proceeding to deal with the samples of "unclean milk," Dr. Collingridge relates a tale of carelessness, indifference and dirtiness—one dairy company placing obstacles in the way of further investigation, though in other instances hearty co-operation was forthcoming. Dr. Collingridge adds :—

"I have in previous reports called attention to the present extremely unsatisfactory state of the milk trade, there being practically no guarantee whatever that milk is free from infection, or even that it is reasonably clean. The majority of dairy companies supplying the City take no steps, except under what amounts to compulsion, to obtain any sanitary supervision of the farms whence they derive their supply, and presumably rely upon that of local authorities, which, in many cases, does not exist. I therefore suggest that the attention of the Local Government Board and the Board of Agriculture and Fisheries be called to this matter, in view of its vital importance to the health of the country.

"The only remedy is to insist upon the Dairies and Cowsheds Regulations being enforced by local authorities, by giving powers to County Councils to act in default, and further, to sanction central interference where this is not sufficient. In the meantime, I recommend that further evidence be obtained by bacterial examination of samples on the same lines, especially of those supplied by the dairy companies referred to.

"One important point requires consideration, viz., the advisability, in the interests of public health, of publishing the name of the dairyman in any case where full information is not given as to the source of any contaminated supply, and where immediate investigation is not made as to the sanitary condition of the farm and the health of the cows, and where steps were not taken to discontinue the supply until any insanitary conditions found are removed. This is necessary, inasmuch as the consumers are unaware of the conditions under which the milk is produced, and are therefore unable to protect themselves against an undoubted danger to health.

"There is no difficulty in securing a clean milk supply if cowkeepers carry out the simple recommendations of the Board of Agriculture and Fisheries, which the Board desire to be made known to all interested in the subject."

Again, cowkeepers are reminded that if they have the will to secure a pure supply they can obtain from the Board of Agriculture a leaflet in which the subject is dealt with in a practical and common-sense manner.—(*Daily Telegraph.*)

THE STATUS OF THE VETERINARIAN IN THE AMERICAN ARMY.

THE War Department has received many complaints from contract surgeons against the ruling that they are not entitled to campaign badges to be issued for war service except when they perform service as an officer or enlisted man. The attention of the Department is called to the fact that under the orders of the Secretary of War veterinarians are, however, entitled to wear such badges, and it is claimed by the contract surgeons that they have been unjustly discriminated against. In some interesting opinions on this subject the Judge Advocate-General of the Army goes extensively into the status of a contract surgeon and a veterinarian. He calls attention to the

fact that the issue of campaign badges is restricted in General Orders No. 4, 1905, to "officers and enlisted men in the Service," and the right to wear them is restricted to the "officers and enlisted men to whom issued," and it is his opinion that under existing orders a contract surgeon would not be authorised to receive or to wear a campaign badge, even though his service had been such as to entitle him to receive it. "Paragraph 61 of the Uniform Regulations," Judge Advocate-General Davis says, "is sufficiently broad to authorise a contract surgeon to wear the campaign badge, but his right to do so is defeated by the restrictive language which is used in General Orders No. 4. If it be thought proper that the campaign badge should be issued to and worn by contract surgeons whose service has been such as to entitle them to it, that end can be obtained by such a modification of the requirements of General Orders No. 4 as will bring it into harmony with Paragraph 61 of the Uniform Regulations." General Davis, with regard to the status of veterinarians, calls attention to Section 2 of the Act of February 2, 1901, which establishes the office of veterinarian in each regiment of cavalry therein provided for. "A subsequent section of the same enactment fixes the pay and allowances of the office so established," he says, "by requirement that the veterinarians thereinbefore authorised shall receive the pay and allowances of second lieutenants mounted. The office so established is a military office which vests in a particular appointee as the result of an exercise of the appointing power, which is vested in the Secretary of War by Paragraph 200 of the Army Regulations of 1901. Veterinarians are not commissioned officers, because their appointments are not made by the President with the consent of the Senate, and are not evidenced by commissions signed by the President; but they are provided with appointments in writing signed by the appointing power, and in all matters relating to pay and allowances, including the clothing allowances, they are assimilated to commissioned officers. It is therefore the opinion of this office that they are entitled to wear the distinctive badge for service in campaign, and should be furnished with the badge at cost price."

(*Army and Navy Journal*, quoted in the *American Veterinary Review*.)

At a recent meeting of the American Veterinary Medical Association the following resolution was passed in order to assist the Army Veterinary Surgeon to obtain proper recognition:—

"Whereas, Our country continues to be the only one of the leading nations of the world that maintains as civilians those who are engaged as veterinarians in our army service, and,

"Whereas, The continued faithful loyal service rendered our Government for more than two score of years without any promise of future reward to those of our number who have entered our army service, and who in the face of these undesirable conditions have enhanced in every way the character of the services rendered, and

"Whereas, The greater need of higher veterinary service in the broadening field of sanitary control and skilled professional inspection work demand more and more a higher scientific standard of the edu-

cational attainments of those added from time to time to this branch of our national service; therefore, be it

"*Resolved*, That in convention assembled, with over three hundred representatives of the profession present from all parts of our country, an appeal be made to our President, our national lawmakers, and our Army Department, to approve the measure presented by our army veterinarians, to the end that a just reward may be accorded them, and that our country be placed on as high a plane as our sister nations in the matter of army veterinary service."

(*American Veterinary Review.*)

WRITING PRESCRIPTIONS.

MANY veterinarians are beginning to realise that the writing of prescriptions is an exceedingly bad practice for many reasons. In the first place, the druggist charges 1,000 per cent. profit in almost every instance, and it is impossible to convince the laity that the veterinarian does not get a share of this profit. Then, again, many druggists will repeat the prescription not only for the original client, but for the whole neighbourhood, and in this way beat the veterinarian out of legitimate fees. Many druggists will also give a copy of the prescription to the client, a rival practitioner, or any empiric that calls for it. If a mistake is made in writing or filling a prescription, the druggist is only too willing to throw the responsibility on the veterinarian. Every veterinarian should, if possible, dispense his own medicines. In this way he will avoid the experience of which the following illustration is a good example. In conversation with a practitioner regarding this subject, he stated that the day before, a good client drove up to his office with a horse having a sore back. Having no facilities for dispensing the proper remedy, he took the client into a neighbouring drug store and wrote him a prescription for a quart of white lotion, for which the druggist charged $1.75; yet the cost of same, including the bottle, could not have been more than ten or fifteen cents. In this case the druggist obtained all the profit of the transaction, as the veterinarian did not like charging a fee for this simple advice to a good client. On the other hand, had the veterinarian been in a position to dispense his own medicine he could easily have handed the client a quart bottle of white lotion, and have collected a fee of from a dollar and a half to two dollars with mutual satisfaction to the client and himself. However, if the practitioner has not the facilities for dispensing medicines properly, it is better to write prescriptions, even if the druggist does reap the profits, than to do as we heard of a veterinarian lately, who dispenses medicine in beer bottles, wrapped up in old newspapers. Unless the veterinarian can do better than this or can exercise the same care as the druggist regarding bottles, corks, labels, and wrappers, it is inadvisable to do otherwise than write prescriptions.

(*Western Veterinarian.*)

RESULT OF THE CHRISTMAS EXAMINATIONS.

THE following gentlemen have passed their Examinations—

† 1st Class Honours. * 2nd Class Honours.

ROYAL VETERINARY COLLEGE, LONDON.

CLASS A.

Mr. R. M. Aulton.
,, B. R. Body.
,, J. B. Buxton.
,, A. W. Brasnett.
,, D. H. Dimes.
,, D. A. Horsford.
Mr. G. L. Ingram.*
,, W. D. Jordon.
,, E. P. Offord.
,, U. F. Richardson.
,, G. Wacher.

CLASS B.

Mr. D. Anderson.
,, C. S. Addison.
,, A. Higgins.
,, W. T. Bright.
,, W. E. Footner.
,, J. N. Glass.
,, W. Jones.
,, E. T. Hand.
Mr. R. C. Matthews.
,, A. L. Moline.
,, E. Middleton.
,, D. O'Kell.
,, J. H. Treseder.
,, H. W. Townson.
,, W. H. Wardrop.

CLASS C.

Mr. H. Bone.
,, J. H. Crane.*
,, A. F. Castle.
,, F. B. Greer.
,, F. E. Jones.
,, P. G. Ledger.
Mr. G. T. Mathews.
,, R. C. Moore.
,, W. J. Phillips.
,, E. D. Sewell.
,, C. H. Strachan.
,, A. E. Webber.

CLASS D.

Mr. J. Andrews.
,, R. Branford.
,, E. Belcher.
,, W. T. M. Browne.
,, T. A. Blake.
,, J. Godber.*
,, B. M. Gurr.
,, A. L. Horner.
,, T. R. Lydford.
Mr. W. J. Macauley.
,, E. S. Martin.
,, B. A. McGuire.
,, D. C. Matheson.
,, R. W. Mellard.
,, S. H. Nixon.
,, C. Taylor.
,, A. Young.

LIVERPOOL UNIVERSITY VETERINARY SCHOOL.

CLASS A.

Mr. H. Beckett.†
,, J. H. Cunningham.
Mr. C. F. Doorly.
,, J. Holroyd.

CLASS B.

Mr. C. S. Elphick.
,, R. L. C. Forrest.
,, R. Hopps.
Mr. J. Lyle.
,, W. Simister.
,, E. T. Henderson.

CLASS C.

Mr. E. Greenway.*
Mr. J. G. Runciman.

CLASS D.

Mr. H. R. Laycock.
,, W. G. Darling.
,, G. H. Petch.
Mr. A. J. O'Leary.
,, J. Sheffield.

ROYAL VETERINARY COLLEGE OF IRELAND.

Class A.

Mr. M. Cunningham.
,, M. Darby.
,, J. Dodd.
,, W. F. Gill.
Mr. A. V. Meeke.
,, M. F. O'Sullivan.
,, J. H. Peard.
,, J. Plunkett.

Class B.

Mr. H. Ballesty.
,, J. Doyle.
,, A. F. Good.
,, B. Hickey.*
,, J. Hilliard.
,, D. Kehoe.
Mr. J. McCormack.*
,, T. D. Taylor.
,, C. Tracy.
,, R. C. Wheeler.
,, S. H. Power.

Class C.

Mr. W. Prendergast (2nd class honours).

Class D.

Mr. G. Barry.
,, C. J. Clibborn.
Mr. E. P. Hearne.
,, W. A. King.

ROYAL (DICK) VETERINARY COLLEGE, EDINBURGH.

Class A.

Mr. John Anderson.
,, S. C. Currie
,, C. Higginson.
Mr. D. Hosford.
,, G. T. Mower.
,, R. Woof.

Class B.

Mr. W. S. Clark.
,, H. D. Gilmore.
,, R. H. Miller.
,, W. P. Ruthven.
Mr. G. C. Webster.
,, W. E. Thompson.
,, T. J. W. Critchley.
,, Fife.*

Class C.

Mr. T. Bagshaw.
,, F. Davidson.
,, H. Gibson.
Mr. G. Gordon.*
,, F. Medlock.
,, R. Waddy.*

Class D.

Mr. A. Barr.
,, C. Crowhurst.
,, J. Donaldson.
,, E. W. Rutherford.
,, R. T. Wood.
Mr. H. Leyland.
,, Percy Penhale.
,, W. L. Richardson.
,, W. J. Young.

GLASGOW VETERINARY COLLEGE.

Class A.

Mr. A. M. Howie.
,, C. McClemont.
,, H. M. Roemmele.
,, S. McCord.
,, M. McKay.
Mr. W. Anderson.
,, E. Pollock.
,, A. Kerr.
,, H. W. Johnstone.

Class B.

Mr. P. McCorry.
,, R. P. Jones.
,, D. Campbell.
,, F. McCall.*
Mr. P. Lindsay.
,, E. Scade.
,, T. Clyde.
,, J. Sommerville.

Class C.

Mr. J. Lowther.
,, J. Thomson.*
,, V. McLeigh.
Mr. P. McIntyre.
,, N. Dickie.
,, D. Rodgers.

Class D.

Mr. F. McShare.
,, J. W. Tate.
Mr. G. Anderson.
,, G. McCall.

Translations and Extracts.

TRYPANOSOMIASIS IN THE EGYPTIAN SUDAN.

BY J. B. CHRISTOPHERSON, M.D., SUDAN CIVIL ADMINISTRATION, KHARTOUM.

In July, 1904, Captain Head, E.A.V.D., asked me to examine some blood taken from a donkey at Goz-abu-Gomez, which was suffering from a disease that was widespread amongst animals taking part in a patrol in the Bahr-el-Ghazel. The symptoms of the disease suggested a tsetse fly infection. The donkeys were very thin, eczematous, anæmic and weak, but took their food well. The temperatures of the animals, when the blood specimens were taken, was generally 103°-105° F. I could not find any trypanosomes, but the blood cells in some of the slides suggested some interglobular infection (? a piroplasm) ; time did not allow of an exhaustive search then. However, there were two mules in the sick lines at Khartoum that had come down from the same expedition, apparently well, two months previously. Trypanosomes were present in their peripheral blood, and became more numerous as the animals got worse, and died. I sent a slide of the blood to Mr. Austen, as I was unable to identify the species of trypanosomes.

The symptoms of the mule disease were: temperature 103°-104° F. Attitude characteristic; head drooping, ears hanging, back legs leaning against each other for support, ribs very conspicuous, œdema of the legs, chest and sheath, anæmia of mucous membranes and running at the eyes and nose. The animals looked starved and listless, with their eyes closed, but fed and drank voraciously. These two mules were Syrian and had been in the Niam-Niam country South of Wau. The Abyssinian ones used in the expedition escaped sickness.

The above seems interesting, especially since Major Griffiths found *Glossina morsitans*, in 1903, on the banks of the Pongo "where the road to Dar Zubeir crosses it" (about lat. 7°) (see Lord Cromer's Report, Egypt, No. 1, p. 94). I believe this specimen of tsetse fly is in the British Museum (Natural History). *Glossina palpalis* has not yet been found in the Egyptian Sudan. In Mr. Austen's "Monograph of Tsetse Flies," page 145, Mr. and Mrs. Petterich are shown to have found tsetse flies near Adæl in 1869 (lat. 6.35°). It is not at all clear that Arnaud, in 1852 (p. 126), or Marno, in 1872 (p. 153), found tsetses in the "Isle of Sennaur," Blue Nile. The seroot fly is very persistent there, but horse sickness and not trypanosomiasis is common during the "charik," or rainy season, in Sennaur, Kassala and Kordofan. Of course tsetse flies may have existed up the Blue Nile in 1852 and 1873 and not in 1904.

NOTE BY Mr. E. E. AUSTEN.

In the slide sent the trypanosomes are very numerous. In the position of the centrosome the specimens resemble *T. Brucei* (Plimmer and Bradford). The nucleus, however, seems very large.

(*Journal of the Royal Army Medical Corps.*)

EXTRA-UTERINE GESTATION IN THE COW. EXPULSION OF THE DEBRIS BY THE INTESTINE.

BY MM. VIGUIER AND SUBERVIOLLE (MONTAUBAN).

THE authors point out that such cases are rare in the domestic animals, but the peculiar conditions which permitted the certain diagnosis of the fœtus in the abdomen outside the uterus induce them to publish the case.

They were called on October 29 to a four-and-a-half-year-old cow that had been unwell for about forty-eight hours, having been accidentally knocked over on her left side. She was seized with colic, turning her head towards the left side and groaning. She was treated, and a couple of hours afterwards was out of pain, but the next morning was again in pain, and suffering from colicky pains.

When first seen the cow was in no actual pain, but she had stopped feeding or ruminating; the temperature was 38·7°, and the functions performed normally. The owner said the cow was some time gone in calf, although the abdomen was but slightly enlarged.

The authors were again called in on November 7, as the owner had found some small bones passed with the fæces that had a very bad smell. From their size they appeared to be those of a five-month fœtus. Examination *per rectum* did not disclose any more bones, but there was the characteristic smell of necrosis.

The diagnosis was an extra-uterine gestation, with communication between the sac and intestine permitting the escape of the *débris* of the fœtus, and, as the cow was in good condition, slaughter was advised.

On examination a large sac, 20 by 8 inches, was found in the posterior portion of the left hypochondriac region, partly adherent to the peritoneum and partly to the small intestine, filled with pus and fœtal bones, and with an opening 3 inches long communicating with the intestine through which the *débris* escaped.

From enquiries it would appear that the cow had been to the bull twelve months previously, and that the fœtus had lived for five months. The digestive troubles did not appear till after the accident, when communication was established between the fœtal sac and the intestine.

(*Revue generale de medecin Veterinaire.*)

BOTRYOMYCOSIS IN THE HORSE.

BY M. P. CHAUSSÉE (ANGERS).

BOTRYOMYCOSIS in the horse is a local disease, characterised by inflammatory tumours, fistulæ and suppuration.

Pus taken from the diseased part contains a number of small yellow granules which, to the naked eye, resemble those found in actinomycosis, but under a moderately high power (50 diameters) they will be found to differ; they resemble bunches of grapes or a mulberry, and are quite different to the tufts of actinomycosis. Each separate globule is from 20 to 100 μ in size, and there are on an average about 50 in a man.

Stained with picro-carmine the granules are coloured yellow and the pus corpuscles pink, but after a few days the carmine permeates the globule and the preparation is of a uniform tint.

Botryomycosis almost always originates in the horse through a wound which has become infected. It develops very slowly, forming a hard, ill-defined tumour which is adherent to the skin, in the subcutaneous tissue, with one or more fistulæ in it, from which a small amount of pus containing the characteristic yellow granules escapes. In a few cases these fistulæ heal up, but in the majority they remain permanently patent. Harness galls are a frequent portal for infection, also kicks, cracked heels, and, in fact, any injury of a like nature.

Surgical wounds also contribute very largely, especially castration, even when the operation is performed with caustic clamps. When the cord has mortified and the clamps are removed, a portion of it is likely to be retained in the wound, and this is invaginated by the action of the cremaster muscle, and the septic matter gives rise to an inflammatory action in the connective tissue of the cord known as "funicalitis," which is the commencement of that condition of the cord that is commonly known as "champignon." Owing to the fibrous nature of the cord the dead tissue has to be sloughed off, and this process takes several days to accomplish, and the cicatrisation of the wound leaves but a small passage, the termination being a cure by the elimination of the necrosed tissue or a chronic enlargement of the cord and surrounding structures, with a fistula forming a suitable soil for the growth of various micro-organisms.

It has been remarked that most prolonged cases of funicalitis from castration terminate in this manner, and the question arises whether the organism of botryomycosis is not a fairly common one. All authorities agree that it is a micrococcus, and morphologically does not differ from a staphylococcus; Hall states that it is the white staphylococcus; Kett, de Jong, Boden and Mari, the aureus or citreus; Sabrazus, Saubie, Galli-Valerio and McFadyean, that it is the staphylococcus of suppuration. Ponset and Dor Parascandolo claim to have discovered a specific organism. It would therefore appear that it is not specifically proved whether the coccus is a specific one or not.

The nature of the yellow granules or botryomyces is still uncertain. Poncet and Dor (*Archives Générales de Médecine*, 1900) are of opinion that they are produced by cellular degeneration of the affected tissue, but others consider that it is simply due to the action of the connective fibrous tissues against the infecting agent. The following clinical cases have come under the author's notice:

(1) Botryomycosis of the shoulder from a collar gall with a large diffused growth, which was perforated by a fistula. The case was inoperable.

(2) A large tumour on the near forearm from a kick. The wound gave rise to induration of the subcutaneous and intermuscular tissue with the formation of abscesses. The patient was neglected, and a fistula formed from which there was a constant discharge of a small quantity of pus. The animal was worked in this condition for two and a half years, the clinical symptoms all pointing to disease of the bone or knee-joint, the pus containing no granules. The animal was destroyed, as he had become useless, and after death botryomycosis was demonstrated.

(3) A large tumour on the right side of the neck, about six inches in circumference, in which there was a sinus from which small quantities of pus were discharged, in which the organisms were detected. The case was operated on successfully, but dissection out of the growth was difficult on account of the intimate adhesion of the tumour and its size. The wound, however, healed up, leaving but a slight blemish, and an enlarged lymphatic vessel disappeared.

(4) A chronic scirrhous cord, which only came on two years after the animal had been castrated by clamps. It had been treated apparently with success, but recurred. The case was operated upon and radically cured. The diagnosis was confirmed by examination of the tumour.

(5) Scirrhous cord that had been in existence for two years. It had been previously operated on by an empiric, but had recurred, extending into the subcutaneous tissue in the extremity of the sheath, and giving rise to abscesses in the inguinal glands. The case was operated upon, the diseased tissue and glands removed, and a radical cure effected.

(6) Nine cases of scirrhous cord that occurred from six weeks to two months after castration, and frequently accompanied by suppuration of the neighbouring glands, but up to the present the organism has not been demonstrated in pus from them.

Bollinger, Thomassen, Rieck-Fröhner, MacFadyean and Koster have found the characteristic lesion in situations at a distance from the original growth, but these are suppurative and inflammatory, and quite different to neoplasm.

On account of the slowness of the inflammatory process, botryomycotic tumours do not show at first any definite characteristics, especially in the case of scirrhous cord, and it is necessary to study such appearances in old ones.

Recent Tumours.—The pathological difference between new and old growths of this nature are especially well seen in those resulting from castration, no doubt from the resistance offered by the cord.

As has before been stated, there is in the first place suppurating funicalitis, which terminates in either resolution or botryomycosis. The growth is conical in shape, with the base downwards, and is formed out of the hypertrophied cord, with the surrounding tissues of canal adhering to it at the lower extremity, which is semi-spherical in shape. In many cases it contains the remains of mortified fibrous tissue that is suppurating, and communicates externally by one or more sinuses. The surface of the cord is covered with granulations and adherent flakes of coagulated lymph, and is generally almost black in colour from the congested state of the vessels and the decomposition of hæmoglobin in the granulations. The cavity or pocket formed between the cord and the walls of the canal contains a quantity of fœtid pus in which there may or may not be granules containing the parasite. The ends of the cord are greatly enlarged, and, if the operation has been imperfectly performed, there may be the remains of the epididymis. In recent cases the neighbouring lymphatic glands are not involved.

The pus contains a variety of micro-organisms, more especially micrococci that colour with Gram's stain. Sections through the granulating parts, or at the junction of the cord with the lining mem-

brane of the canal where they are adherent, show that the fibrinous coagula in process of organisation are full of micro- and strepto- cocci, and that they are collected together in masses and chains. At the upper part of the cord the peripheric connective tissue is thickened and œdematous.

In chronic or old-standing growths the tissues have a fibrous appearance. They are ill-defined, hard, white, and on section have a glistening appearance. There are one or more sinuses opening outwards towards the point of inoculation, from which there is a discharge of pus, in which the characteristic granules are to be found. On examining a section of the tissue taken from the neighbourhood of a sinus, a number of small, circular patches can be seen : these are inflammatory nodules formed round one or more masses of the parasite, but these cannot, as a rule, be distinguished by the naked eye.

Old-standing scirrhous cord only differs in its structure from growth in other regions by having the cord in its centre and its conical shape; also that the parasite is only found at the lower part. The suppurating cavity in the centre of the growth is obliterated by union with the cord, and for this reason there is less discharge of pus from old than there is in recent cases.

The structures that present themselves for microscopic examination are the botryomycotic nodule, the botryomyces, the internodular tissue and intercellular pigmentary granulations, in old cases and in some recent ones.

The nodules greatly resemble ordinary inflammatory ones. They vary in size from $\frac{1}{2}$ to 3 or 4 millimetres in diameter, and are visible to the naked eye. The central botryomyces are not as large as those found in pus, and can only be detected under the microscope. When magnified to 150 or 200 diameters, the parasitic nodule is seen to be surrounded by a large number of round embryonic cells with very large nuclei, those in the vicinity of the parasite being compressed. Amongst the connective-tissue cells they become elongated by pressure, having some resemblance to epithelium, but if there is sufficient space they become circular. The transition between the nodular and internodular tissue is gradual, and in the deeper parts there are no giant cells.

The internodular tissue forms the largest portion of the growth. It is dense and filarious in structure, formed of long undulating fusiform cells, with round or polygonal ones in the interspaces. In certain cases of botryomycosis from the neck the author has noticed atrophied muscular fibres in isolated patches surrounded by connective tissue. With Gram's stain the globules show masses of cocci unevenly distributed through them, there being fewer at the centre than at the outer border. Even in old-standing growths the organisms are coloured if left in the stain for a sufficient time.

The cocci are more difficult to find in growths in process of formation, as it is difficult to cut sections, and they are likely to be removed on manipulation from the surrounding tissues.

Pigmented granulations are nearly always present and are scattered irregularly about the growth. They are of a yellow colour, from 15 to 20 μ in diameter, round in shape, and filling up the cell, which is dilated, the nucleus being forced on one side ; there may be several

of these masses of pigment in the one cell, and they are found in both the round and fusiform ones. They appear to be insoluble. Treated with sulphocyanide of potassium and hydrochloric acid they colour a deep blue, and with hydrosulphate of ammonia black, showing that they contain an appreciable quantity of iron.

It was at one time thought that these masses of pigment were the embryonic form of the botryomyces, but the parasite gives a different reaction, and in these pigmentary masses no cocci are shown by Gram's stain. There are no blood-vessels in the inflammatory nodules themselves, but there are in the internodular tissue.

The tumours are partly formed by the organisation of fibrous clots and partly by the division of the cells, each of which becomes the centre of a new nodule.

The conclusions arrived at are that the tumours are formed of masses of the parasite, each mass contained in a sheath which is sloughed out. The growths are diffused and have no pedicles; the inflammatory tissue closely resembles that found in connection with actinomycosis, but is much more dense and fibrous in character. The epithelium of glands when surrounded by the new growth may be compressed and distorted, but does not alter its character. Except when very old, the growth does not become cartilaginous or calcareous, but the fibrous tissue becomes more dense in some places, in others softer. Infection is at first limited to the edges of the wound, and, at all events in castration, does not assume any specific characteristics for a considerable time, and the first stages of the parasite is not always present. The disease is not a "mycosis," and the term "botryococcosis" would appear to be more appropriate.

(*Revue Générale de Médicine Vétérinaire.*)

CATTLE PLAGUE IN ERYTHERIA.

BY MEMMO MARTOGLIO AND ADANI.

THE disease which is known in Abyssinia as gulhai is recognised to be rinderpest, and appears to have been imported into Erytheria in 1888 by animals that accompanied the Italian army. The mortality is very great, and both Abyssinian and ordinary native cattle appear to be equally susceptible, also sheep, but in a benign form. The disease also appears capable of being conveyed by wild animals, jackals and dogs, and probably also insects. One attack appears to confer immunity, and such animals are termed uza-gulhai, and are of increased value. Serotherapy has given good results as a curative agent, especially when the case has been carefully nursed from the commencement. As a preventive it gives temporary, but when combined with vaccination a permanent, immunity. Animals that are attacked should be isolated, and hides disinfected by exposure to the sun for four days.

The authors have also studied the nerfi, or charbon giaan, which is allied to surra, or nagana, and piroplasmosis. These last diseases often exist in a latent form, and are antithetic to vaccination.

Horse-sickness and epizootic lymphangitis are also common, but the latter is easily curable.

(*Clinica Veterinaria.*)

THE DIAGNOSIS OF GLANDERS.

BY J. NICOLAS, LYONS.

CERTAIN authorities have shown that the intraperitoneal injection of various other anærobes besides the glanders bacillus will cause the typical reaction of Straus in the guinea-pig. M. Nicolas has shown that in the nasal discharge from a non-glanderous horse there is a cocco-bacillus which is ærobic, about one inch in diameter, takes Gram's stain, and which will give rise to all the usual symptoms in the guinea-pig.

In the horse the right submaxillary gland is enlarged, rounded, hard, and painful; there is unilateral discharge of a yellow colour that is thick and adhesive, but there is no ulceration; the animal is in good condition and spirits. The mallein test is negative, but the injection of the discharge into the peritoneum of the guinea-pig gives rise to orchitis. If the animal is killed the *post-mortem* appearances are identical with those of glanders, but the pus does not contain the bacillus of Loffler, and by Gram's stain the presence of a round organism in large quantities is demonstrated. If guinea-pigs are inoculated in the peritoneum with the preparation, the liver, spleen, and lungs become studded over with small conous nodules, which will reproduce identical lesions in other guinea-pigs. A fresh series of inoculations, either with natural material or cultures both from broth and potatoes, gives rise to orchitis and nodules of the various glands.

The lesions are the same as those caused by Loffler's bacillus, but the action is more rapid; the orchitis, however, does not ulcerate, and sometimes has a tendency to heal. Injected into the veins the virus will rapidly kill rabbits, but, contrary to that of glanders, has no action on the dog.

Straus's reaction, therefore, does not appear to be of great practical value.

(*Journal de Médecine Vétérinaire et de Zootechria.*)

SUBCUTANEOUS EMPHYSEMA, OR AIR UNDER THE SKIN IN DUCKS.

BY DUNCAN HUTCHEON, M.R.C.V.S., CAPE OF GOOD HOPE.

THE Chief Veterinary Surgeon, Cape of Good Hope, writes:—We have received some young ducks for examination, and have heard of a number of others in which the cellular tissue under the skin is enormously distended with air. In one very pronounced case the duck looked more like a toy duck formed of a bladder distended with air than a living bird formed of solid tissues. The subcutaneous cellular tissue over the whole body was tensely distended with air, but notwithstanding this extraordinary condition the duck did not appear to manifest any particular pain or even distress. It could walk with comparative ease and ate food moderately. Being an exaggerated case it was retained for treatment. This consisted in puncturing the skin in places, with a small trocar and canula, and pressing the air out. Slight massage was applied to the skin all over the body. This operation had to be repeated at intervals during the first two or three

days, as the air accumulated under the skin again very rapidly. Meanwhile the duck fed well and appeared to suffer comparatively little visible discomfort. After some days, with the exception of a little puffiness about the head and neck, the skin appeared to be becoming re-attached to the subcutaneous tissues; and further treatment was stopped, as the attendant reported that it was going on all right. About eight days after it was sent for again for re-examination, when it was discovered, on tapping the swelling in front of the breast, that instead of air alone escaping bubbles of fluid were mixed with it, and it was observed to be somewhat septic in character. The duck was then killed for the purpose of making a *post-mortem* examination. This revealed the following lesions: There was a little fluid exudation into the cellular tissue under the skin, more particularly on the left side and around the head and neck. The left lung was affected with septic pneumonia, and the left cervical air reservoir or sac was ruptured, thereby permitting free communication between the left lung and the subcutaneous cellular tissue. It may be necessary to explain that in birds the organs of respiration are very different from those of mammals. In birds there are four pairs of air sacs or reservoirs—and one single. These communicate freely with the lungs and with some of the bones. These sacs are named according to their position as follows: two cervical, two anterior diaphragmatic, two posterior diaphragmatic, two abdominal and one thoracic sac. Besides giving additional air space for the purposes of respiration—the lungs being comparatively small—these air sacs assist locomotion by diminishing the weight of the body, and by their position rendering equilibrium more stable.

(*The Agricultural Journal of the Cape of Good Hope.*)

CAUSES OF RUPTURE OF AIR SACS, OR THE AIR CELLS OF THE LUNGS.

This is usually due to violent exertion of any kind. Ducks are most liable to this, because young ducks, as a rule, when disturbed rush about like mad things, trampling on and crushing one another. It is comparatively rare in fowls. The treatment consists in carefully puncturing the skin with a small trocar and canula, or a small knife, and carefully pressing out the air. Make as small an opening as possible and see that the instrument is clean. Gentle massage should also be carried out, so as to expel the air from the cellular tissue and allow it to resume its healthy function. In mild cases they recover rapidly and suffer very little.

(*The Agricultural Journal of the Cape of Good Hope.*)

CATTLE DIPS AND THEIR VALUE AS DESTROYERS OF TICKS.

Mr. Lounsbury, the Cape of Good Hope Government entomologist, has conducted a series of experiments at the Rosebank Experimental Station, the main object of which was to increase our knowledge of

the action of the substances used for the destruction of ticks. The results obtained by these experiments were—(*a*) that arsenic is the principal agent which acts on the ticks in these dips; (*b*) that only the preparations containing the largest percentage of arsenic, that is, only those that were estimated to contain one pound of arsenic to thirty gallons of water, ever destroyed the ticks; and in most cases even these strongest mixtures failed to prevent a few females from maturing. Mostly, however, such females died without laying eggs, and nearly all the eggs that were laid failed to hatch.

(*The Agricultural Journal of the Cape of Good Hope.*)

VALUE OF LOCUSTS AS STOCK FOOD.

BY C. W. MALLY, M.SC., ACTING GOVERNMENT ENTOMOLOGIST, GRAHAM'S TOWN, CAPE OF GOOD HOPE.

WHEN the locusts have once attained the fourth and fifth stage of development they are too valuable to be simply killed and allowed to rot on the veld, especially since they can be easily trapped, killed and dried. It is no uncommon thing to hear the remark, "everything eats locusts." The natives are very fond of them and fare very well indeed, even in times when there is little else for them to eat. Ostriches and poultry do wonderfully well on them. Horses, sheep and pigs are also fond of them. No one doubts the value of locusts as stock food. Just what rank they should have among the different feeding-stuffs can best be determined by chemical analysis, together with experimental feeding. A supply has been handed to the Government Analyst, Mr. J. Müller, Graham's Town, and his report will be awaited with interest.

The question of a market for the dried locusts naturally suggests itself. Several ostrich farmers told me they would be glad to buy quantities of dried locusts to feed their birds after the locusts have disappeared. There will no doubt be sufficient demand in the market, but the difficulty will be to supply it. It is my opinion that when the farmers once realise the value of the dried locusts they will prefer to turn them into money by feeding them to their own stock.

It is claimed that the influence of the locust diet is very noticeable in the eggs of fowls. On one occasion I noticed an egg the yolk of which was rather large and of a decidedly red colour. The party to whom the egg was served revealed no signs of anything unusual in the flavour. By mere chance I mentioned the fact in the presence of farmers who had every opportunity of knowing, and they said at once that they always noticed that change in the eggs after the fowls had been feeding heavily on locusts for a time. They were not so sure about the influence on the flavour of the eggs. If the above statements are found to be correct under conditions of proper feeding, it will be a serious objection. On the other hand, it would not be surprising to find that the locust diet has a direct influence on the vitality of the chicks. If this proves to be correct, then the locusts will be of special value to the ostrich farmer and the poultryman at the beginning of the breeding season.

(*The Agricultural Journal of the Cape of Good Hope*).

FURTHER NOTES ON PIROPLASMOSIS OF THE HORSE, MULE AND DONKEY.*

BY DR. A. THEILER.

Inoculability of Piroplasmosis.

The description of the piroplasma found in horses, mules and donkeys was fully entered into in my previous communications on this subject. Symptoms and *post-mortem* lesions observed in the disease in mules and donkeys as encountered in the field were dealt with in my Annual Report for the year 1903-4. At that time I expressed the opinion that the piroplasmosis in the three above-mentioned equines was identical, due to the same species of piroplasma, namely, piroplasma equi (Laveran). The conclusive proof, viz., that of producing the disease in the horse with virulent mule or donkey blood, or *vice versâ*, was at that time wanting. I had only one observation at my disposal, that showing the inoculability of equine piroplasmosis from an immune horse into a susceptible one by means of the defibrinated blood of the former. This observation indicated a close relationship of equine, bovine, and canine piroplasmosis, where the blood of immune animals proves to be infective for susceptible animals of the same species. Having failed in former experiments to transmit the piroplasmosis of the donkey into the horse, because only country-bred or well-acclimatised horses were obtainable, resource was had this time to imported horses, mules, and donkeys from the Argentine Republic—animals which, as we know from practical observations, are very susceptible to piroplasmosis. To exclude any possible natural infection they were kept stabled on the premises of the Laboratory. The infective material was derived in every instance from immune animals. The first experience with the blood of an immune horse having proved successful, the same might be expected from immune mules and donkeys. The object of the experiment was not solely directed to demonstrate the identity of the piroplasma in the various equines, but also to test the possibility of a preventive inoculation similar to the one in redwater. The experiments also give us useful information respecting the incubation course of the disease and its immunity, and will prove so closely allied to redwater in cattle that more than a similarity must be expected, although an absolute identity is not probable.

A.—Experiments to Prove that the Inoculation of Blood of a Horse Immune against Equine Piroplasmosis Produces Piroplasmosis in Susceptible Animals.

(1) Experiment, Argentine horse, No. 599, about four years old, brought directly from board ship to the premises, was injected on October 3, 1904, both intrajugularly and subcutaneously, with 10 cc. defibrinated blood of a horse, No. 523, which in July of the same year had recovered from a spontaneously acquired attack of biliary

* Abstract from the *Transvaal Agricultural Journal.*

fever, during the fever reaction of which piroplasma equi was very frequently found in the blood. After an incubation period of six days, viz., to October 9, 1904, the temperature rose, and on the seventh day (October 10, 1904) piroplasmata were present in the blood. These parasites had increased within twenty-four hours, after which time rosettes were especially numerous (October 11, 1904). Red urine was voided for the first time on October 11, 1904, and it was noticed during the following few days. A spectroscopical examination, both in my laboratory and in that of Mr. Ingle, Chief of the Chemical Division, proved the exclusive presence of oxyhæmoglobin, which was still present in traces after the urine had cleared up and taken a more brownish colour. On October 15, 1905, a decrease of the number of parasites was distinctly noticeable, the parasites becoming rarer, and at the same time a slight poikylocytosis made its appearance. The decrease kept on, and on October 20 the parasites had disappeared. The symptoms which were observed during the course of the disease, besides red urine, were a strongly pronounced jaundice, a rapid loss of condition, accelerated hard breathing and rapid pulsation of the heart. The hard breathing kept on for some time after the temperature had returned to more or less normal elevation. The examination of blood was discontinued. A slight secondary reaction was noticed, starting at twenty-four days after inoculation and lasting about ten days. Since no microscopical examination was made during that reaction, it is impossible to say to what it is due.

(2) Argentine horse No. 598, about four years old, injected on November 4 intra-jugularly with a mixture of defibrinated blood of horses 442, 523 and 599, all of which had passed through an attack of biliary fever (compare Nos. 523 and 599 to first experiment), No. 422 on September 19 to 27, 1904. A reaction began four days later, but did not reach a high elevation. The piroplasma equi could only be traced during the descending period of the fever, at which time rosettes were found. Then followed a period of six days when the temperature was normal, and during which no piroplasmata were seen, to be suceeded by a high elevation of the fever and the reappearance of piroplasma equi and an irregular temperature curve, which after seven days became normal. In this horse the peculiarity was noticed that during the first fever reaction the round piroplasma was principally noticed; in the second, one quite atypical form was seen, more oval, even willow-leaf shaped, and twin parasites in one and the same red blood corpuscle, as in the case of piroplasma bigeminum.

(3) Argentine horse 603, about 4 years old, was injected on November 28, 1904, with defibrinated blood of horses 442 and 599, 15 cc. under the skin and 15 cc. into the vein. Piroplasma equi was noticed in this horse on December 6, 1904, when rosettes were present, and at a time when fever reaction had not yet properly started. The parasite were present during the first seven days, when they disappeared completely. The animal had been treated with a subcutaneous injection of quinine. As is frequently the case in biliary fever, a local phlegmosis formed on the place of injection, which was responsible for the continuance of the fever. The following tabulated record of the count of red corpuscles during the disease shows their decrease and increase :—

Date.	No. of Red Corpuscles.	Presence or Absence of Piroplasma.
Nov. 29, 1904	7,200,000	
,, 30, ,,	6,610,000	
Dec. 1, ,,	6,260,000	
,, 2, ,,	6,400,000	
,, 3, ,,	6,000,000	
,, 4, ,,	5,840,000	
,, 5, ,,	5,800,000	
,, 6, ,,	5,080,000	Piroplasma equi appears. Rosette.
,, 7, ,,	4,792,000	Piroplasma fairly frequent. Rosettes, round, oval and flagellated forms.
,, 8, ,,	3,420,000	Piroplasma rarer.
,, 9, ,,	2,320,000	Piroplasma still rarer. Some bacillary-shaped forms are visible.
,, 10, ,,	2,888,000	Examination remains negative.
,, 11, ,,	2,764,000	Piroplasma equi very rarely met with.
,, 12, ,,	3,552,000	Piroplasma absent, Dec. 13, 1904.
,, 13, ,,	4,560,000	,, ,,
,, 14, ,,	5,936,000	,, ,,
,, 15, ,,	6,160,000	,, ,,
,, 16, ,,	6,552,000	,, ,,
,, 17, ,,	6,496,000	,, ,,

During this time the usual characteristic symptom of equine piroplasmosis—viz., jaundice—was present, and a rapid loss of condition took place. The horse had apparently recovered when, on December 21, a second attack of fever occurred lasting five days, to which the animal succumbed. During this reaction round and willow-leaf shaped parasites were noticed, and twin forms were also met with.

Post mortem revealed a slight jaundiced condition of the serous membranes of the body. There were petechiæ on the endocardium of the left ventricle, and also on the epicardium. The liver was enlarged and of a normal colour. The spleen was but slightly enlarged. The remainder of the organs seemed to be normal.

(4) Argentine horse 597, about 4 years old, was injected on November 28, 1904, with 10 cc. blood of horse 523 (compare Exp. A. 1). In this case piroplasmata were seen before there was an elevation of temperature, which elevation took place late and lasted for four days. The piroplasmata were but rarely met with. The symptoms of an anæmia were well pronounced by an extensive paleness of all mucous membranes. There was no jaundice present. The following tabulated record shows decrease and increase of the red corpuscles during the reaction.

Date.	No. of Red Corpuscles.	Presence or Absence of Piroplasma.
Nov. 29, 1904	6,080,000	
,, 30, ,,	5,144,000	
Dec. 1, ,,		
,, 2, ,,	3,536,000	
,, 3, ,,	3,948,000	
,, 4, ,,	3,720,000	
,, 5, ,,	3,984,000	Piroplasma equi present.
,, 6, ,,	4,652,000	Piroplasma equi present, but rare.

Date.	No. of Red Corpuscles.	Presence or Absence of Piroplasma.
Dec. 7, 1904	4,800,000	Piroplasma equi present, but rare.
„ 8, „	4,884,000	„ „ „
„ 9, „	4,954,000	Piroplasma equi very rare.
„ 10, „	3,416,000	Piroplasma equi absent.
„ 11, „	2,496,000	„ „
„ 12, „	3,052,000	
„ 13, „	2,480,000	
„ 14, „	3,408,000	
„ 15, „	5,238,000	
„ 16, „	5,392,000	
„ 17, „	6,132,000	

On December 30, 1904, this horse was subjected to the simultaneous horse-sickness inoculation. It passed through an attack of dikkop and recovered, the temperature returning to normal, when on January 16, 1905, the temperature rose suddenly again, piroplasma equi reappeared in the blood, and the animal died on January 23, 1905.

Post mortem showed a fair condition. There was a yellow discoloration of the mucuous membrane, a subcutaneous collection of yellow liquid. The lungs were in a state of œdema, and somewhat pale in colour. The epicardium was diffusely reddened by petechiæ, and large ecchymoses were found on the endocardium of both ventricles. The liver was much enlarged, yellow, and the central veins were filled with blood. The spleen was but slightly enlarged and rather firm. The kidneys were pale. The lymphatic glands of the various regions were enlarged.

(5) Argentine horse No. 606, about 4 years old, injected on November 11, 1904, with 30 cc. of a mixture of blood of horses 442 and 599 (compare Exp. A. 1 and A. 2), 15 cc. subcutaneously and 15 cc. into the jugular vein. After an incubation period of five days the temperature rose. The following day symptoms of jaundice were noticeable in the eye. Piroplasmata were very frequent during the reaction, which lasted ten days and ended with death on December 13, 1904. The *post mortem* revealed the typical picture of equine piroplasmosis with general jaundice.

Conclusions.

(1) Equine piroplasmosis is inoculable with blood of an immune horse into a susceptible horse, the Argentine horse proving very suitable for this purpose.

(2) The piroplasmosis produced by an inoculation with immune blood has an incubation time ranging from five to six days.

(3) In cases of recovery from the first attack of piroplasmosis a second attack is usually observed, during which the piroplasma equi is less frequently found than in the first attack, and also changed in shape, usually adopting the leaf form. Death may result from either the first or the second attack, but is more frequent after the second.

(4) The pathological change caused by the piroplasma equi is an acute anæmia, due to the destruction of red corpuscles.

(5) The inoculation of blood from an immune horse into a susceptible one proves to be very dangerous when injected intrajugularly, and offers but little prospect for a practical inoculation.

B.—Experiments to Show that the Inoculation of Blood of a Horse Immune against Equine Piroplasmosis Produces the Disease in Susceptible Mules.

(1) Argentine mule No. 587, about 3 years old, directly imported from board ship, was injected on November 4, 1904, with a mixture of defibrinated blood of horses 523, 599, 442 (compare A. 1 and A. 2), of each 5 cc., viz., 15 cc. into the jugular vein and 15 cc. under the skin. On the fifth day a first rise in temperature took place, but the examination of the blood remained negative. It was followed by a second reaction, during which piroplasma equi was present. After the lapse of about ten days, during which the examination of the blood gave negative results, another reaction took place, during which the piroplasma equi again made it appearance. Since then no further disturbance was noticed in the temperature curve. This animal showed during the first reaction a pronounced paleness of the mucous membranes, and lost considerably in condition.

Argentine mule No. 588, about three and a half years old, same origin as above. Injected on November 28, 1904, with a mixture of equal parts of blood of three immune horses Nos. 442, 523, 599 (compare Exp. A. 1 and A. 2). A first slight disturbance took place on December 4th, 1904, viz., six days after injection. Piroplasma equi was seen the next day; it increased in numbers, and during December 8 to 9, 1904, rosettes were fairly frequent. From December 10, 1904, when the temperature had reached its highest point, the parasites become rarer; at the same time some atypical bacillary-shaped ones appeared. The next day, viz., December 11, 1904, the parasites had almost vanished out of the blood. After a lapse of about seven days a second reaction took place, starting December 19, 1904, during which, unfortunately, no examination took place.

(2) Mule 596, about three years old, similar origin as previous one, was injected, on November 28, 1904, intrajugularly with 10 cc. of blood of horse 523. On the eighth day after inoculation a slight increase of temperature occurred, and the following day piroplasma equi appeared in the blood. The reaction was, however, slight, and the parasites were very rarely seen. Also in this case a second reaction occurred a few days after the first one had abated, the examination of the blood during which gave negative results. The following tabulated form gives the record of the number of red corpuscles during the first reaction :—

Date.	No. of Red Corpuscles.	Presence or Absence of Piroplasma.
Dec. 5, 1904	5,792,000	
,, 6, ,,	6,448,000	
,, 7, ,,	6,600,000	Piroplasma present, but rare.
,, 8, ,,	6,712,000	,, ,,
,, 9, ,,	6,140,000	,, ,,
,, 10, ,,	4,392,000	,, ,,
		Mucous membranes pale.
,, 11, ,,	5,312,000	Piroplasma present.
,, 12, ,,	4,948,000	
,, 13, ,,	4,728,000	
,, 14, ,,	6,500,000	
,, 15, ,,	6,336,000	
,, 16, ,,	6,720,000	
,, 17, ,,	6,832,000	

(3) Mule 595, about four years old, same origin as previous one, was injected on November 28th, 1904, with a mixture of blood of horses 599 and 442 (compare Exp. A. 1 and A. 2), viz., 15 cc. subcutaneously and 15 cc. intrajugularly. After a lapse of five days a slight rise of temperature was noticeable, during which the piroplasma equi was fairly frequent; then a distinct high reaction set in, lasting from December 8 to 14, 1904, and during which the piroplasma was but rarely noticed. Also in this case a second reaction, although not very characteristic, took place, but no parasites were seen. The following tabulated form gives a record of the number of red corpuscles during the first reaction.

Date.	No. of Red Corpuscles.	Presence or Absence of Piroplasma.
Nov. 29, 1904	6,580,000	
Dec. 3, ,,	7,012,000	
,, 5, ,,	5,816,000	
,, 6, ,,	6,120,000	
,, 7, ,,	6,698,000	Piroplasma fairly frequent.
,, 8, ,,	5,400,000	
,, 9, ,,	4,528,000	Piroplasma rare.
,, 10, ,,	3,064,000	,, ,,
,, 11, ,,	3,928,000	,, ,,
,, 12, ,,	4,376,000	
,, 13, ,,	4,072,000	
,, 14, ,,	5,048,000	
,, 15, ,,	4,908,000	
,, 16, ,,	5,000,000	

(4) Mule 595, about four years old, same origin as previous one, was injected on January 16, 1905, with 10 cc. defibrinated blood of horse 597 (compare Exp. A. 4). A slight reaction took place, and on the ninth day piroplasma equi was noticed in rare numbers. In this instance no second reaction was noticeable.

Conclusions.

(1) Equine piroplasmosis is inoculable with the blood of an immune horse into a susceptible mule, Argentine mules proving very susceptible for this purpose.

(2) The incubation time of piroplasmosis in mules corresponds with that found in horses.

(3) All inoculated cases ended in recovery. As in horses, two reactions are observed, the second one being characterised by the scarcity or complete absence of parasites.

(4) The inoculated piroplasmosis is in mules not so fatal as in horses, and the anæmia is also less pronounced.

(5) The inoculation of blood from an immune horse into a susceptible mule can be made use of as a means of preventive inoculation against piroplasmosis.

C.—Experiments to Show that the Inoculation of Blood of a Horse immune against Piroplamosis Produces this Disease in Susceptible Donkeys.

Donkey 730, about four years old, imported from the Argentine, and brought by rail from Cape Town off the boat, was injected with

blood of horse 597 (compare A. 4). There was a distinct primary, followed up shortly afterwards by a secondary, reaction. By some mistake, the blood of this donkey was only examined after the secondary reaction had passed. Piroplasma equi was therefore not found in this case. The donkey lost rapidly in condition, went down and could not lift himself. He died on February 12, 1905.

A *post mortem* revealed a slightly enlarged spleen, with softened pulpa. There was a slight increase of liquid in the heart-bag, and *ante-mortem* clots in both ventricles. These lesions indicate piroplasmosis, viz., the chronic form of this disease.

Donkey 739 and donkey 740 were both injected on March 21, 1905, with 10 cc. blood of horse 724 (compare Exp. D. 1) subcutaneously. Both donkeys showed a typical fever reaction, during which the piroplasma equi was found, namely, in donkey 739 on March 27, 1905, and March 28, 1905, and in donkey 740 on March 29, 1905, and March 30, 1905. The reaction in both cases was very slight, and could only be diagnosed as piroplasmosis by the microscope.

Conclusion.

The injection of blood of a horse immune against piroplasmosis into a susceptible donkey produces piroplasmosis in the donkey.

D.—Experiments to Show that the Blood of a Mule Immune against Equine Piroplasmosis Remains Infective for Susceptible Horses.

(1) Horse No. 724, about four years old, imported from Argentine and landed at Cape Town; brought from aboard ship direct by rail to Pretoria. It was inoculated intrajugularly on January 16 with 10 cc. def. blood of mule 502 (compare B. 3). After three days already a reaction, started which lasted five days; piroplasma equi was noted for the first time on January 22, and disappeared after the temperature had returned to normal. The animal showed all the symptoms of biliary fever, and had lost in condition, lying down, and being unable to stand for some days. From February 14 to 23 a second reaction took place, during which, however, no piroplasma was seen. This second reaction reduced the animal to a skeleton.

(2) Horse 721, the same origin as above. It was infected subcutaneously on January 15 with 10 cc. blood of mule 592 (compare B. 3). A reaction began already on the fifth day. The temperature did not go high: its culmination point was at 104° F. Piroplasma equi was present on February 23, and during the following days up to date of death, which occurred on February 26. *Post mortem* was made soon after death. There was a slightly jaundiced condition of the serous membranes. The spleen was about the double of its normal size, with softened pulp. The liver was dark brown, strongly congested. The kidneys showed the colour of sepia.

Conclusions.

(1) Equine piroplasmosis is inoculable from immune mules into susceptible horses.

(2) The piroplasmosis of horses produced by immune blood of

mules is of a very grave character, and there is little prospect that immune mule blood can be utilised for the inoculation of susceptible horses.

E.—Experiments to Show that the Blood of a Mule Immune against Equine Piroplasmosis Remains Infective for Susceptible Mules.

(1) Mule 593, Argentine, about four years old, brought directly from board ship to the laboratory, was injected on January 16, 1905, with 10 cc. defibrinated blood of mule 587 into the jugular vein (compare Exp. B. 1). From the sixth day a disturbance of the temperature took place without showing any regular course. The examination of the blood gave negative results.

Conclusion.

Although this strict proof—viz., the demonstration of the piroplasma equi—is lacking, we are entitled to accept that the temperature reaction was due to the inoculation of the blood, since we know from previous experiments that mules support inoculations with immune blood easily.

F.—Experiments to Show that the Blood of a Mule Immune against Equine Piroplasmosis Remains Infective for Susceptible Donkeys.

(1) Donkey 737, imported from the Argentine, and from ship at Cape Town brought directly to Pretoria, was inoculated on January 16, 1905, with 10 cc. def. blood into the jugular vein. A slight disturbance of the temperature only took place after fourteen days, and a further disturbance was noticeable after three weeks. There is, however, no proof that the reaction was due to the presence of piroplasma equi.

(2) Donkey 741, same origin as above. It was injected on February 15, 1905, with 10 cc. blood of mule 592 (compare Exp. B. 3). On February 27, viz., twelve days after inoculation, and during a very slight fever reaction, the piroplasma equi was found in the blood. They had appeared already the next day. A second more distinct reaction started about sixteen days after the inoculation. The examination of the blood gave, however, negative results.

Conclusion.

The inoculation of blood of a mule immune against equine piroplasmosis, produces a mild disease in donkeys with a primary and secondary reaction; the inoculation of such blood may therefore be made use of as a practical inoculation for donkeys against the disease.

G.—Experiments to Show that the Blood of a Donkey Immune against Equine Piroplasmosis is Infective for Susceptible Horses.

(1) Horse No. 600, Argentine, about four years old, brought from board ship in Durban to Pretoria, was on January 16 injected intra-

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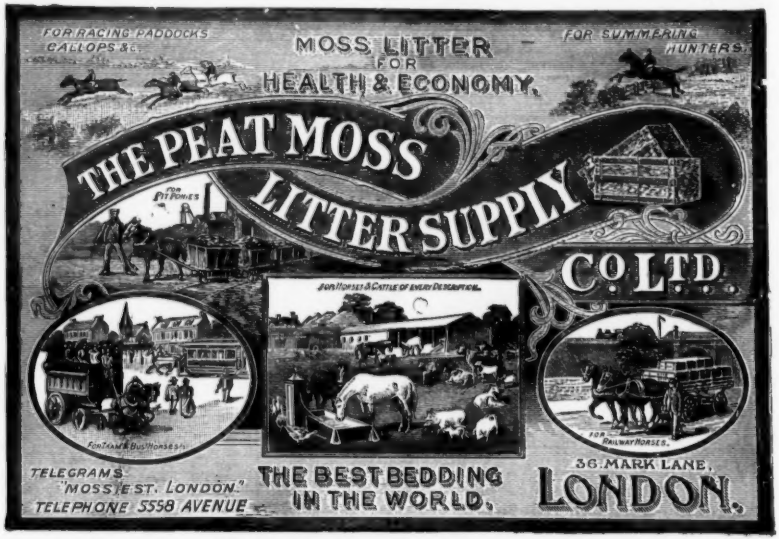
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The "COUNTY GENTLEMAN," *April* 1, says: "Chief among the merits of Peat Moss are the ease with which it is stored; the small danger it offers as regards fire compared with Straw; non-conductivity; the great powers of absorption; its antiseptic properties, and the ease and advantage with which it can be used as Manure in town gardens and in the country."

jugularly with 1 cc. def. blood of a donkey No. 306. This donkey was a country-bred animal, and has been hyper-immunised with horse-sickness blood of horses. On January 22, 1905, the temperature began to rise, to reach 105° F. on January 25, on which day the piroplasma equi was frequent. A very severe attack of biliary fever had developed, the symptoms of jaundice being well pronounced on January 25. The horse recovered from the first reaction, when a slight secondary reaction took place, closely followed by a third distinct one, during which the piroplasma equi was seen again. The horse recovered, but had lost enormously in condition.

(2) Horse 723, Argentine, about three years old, brought from board ship in Cape Town direct to the laboratory. Inoculated on February 15, 1905, with 10 cc. def. blood of donkey 300 (compare previous experiment) under the skin. From the fifth day after the injection a slight reaction began. On the ninth day piroplasma equi was present. The number increased during the next few days, rosettes being noticed freely. The reaction was not actually a heavy one; notwithstanding this, all the clinical symptoms of jaundice had developed. A second slight reaction occurred on March 7 and 8, viz., three weeks after inoculation, during which, however, no piroplasma was seen. The horse contracted horse-sickness spontaneously, and died on March 15.

Conclusions.

(1) The inoculation of the blood of a donkey immune against equine piroplasmosis produces this disease when injected with that of susceptible horses.

(2) In the course of the disease, two reactions were noticeable.

(3) Although the clinical symptoms indicated a fully developed disease, it was not so grave as to cause death.

There does exist some prospect of utilising the blood of immune donkeys for inoculation purposes against biliary fever of the horse.

H.—Experiments to Note whether the Blood of a Donkey Immune against Equine Piroplasmosis will Produce the Disease when Injected into Susceptible Mules.

(1) Mule 590, Argentine, about three and a half years old, brought from board ship at Durban to Pretoria, was inoculated in the jugular vein on January 16, 1905, with 10 cc. def. blood of donkey No. 306 (compare G. 1, 2,). On the ninth, tenth and eleventh days a slight reaction was noticeable. The temperature on January 25 was 103·8° Fahr. Piroplasma equi was not seen. Nothing to identify with a second reaction occurred after this.

(2) Mule 591, Argentine, about three years old, same origin as previous one. It was inoculated on February 15. A slight reaction took place and a second, likewise slight one, was noticeable about the third week. Piroplasma equi was not seen.

Conclusion.

The blood of a donkey immune against equine piroplasmosis produced a slight reaction in susceptible mules. This reaction corre-

sponded in its character to those found in mules injected with immune blood of horses and mules. There exists every prospect of utilising the blood of an immune donkey for the inoculation of mules against biliary fever.

I.—Experiments to Show that the Blood of a Donkey Immune against Equine Piroplasmosis will Produce the Disease when Injected into Susceptible Donkeys.

(1) Donkey 738, Argentine, brought from board ship Cape Town to Pretoria, was injected into jugular vein with 10 cc. def. blood of donkey 306 on January 16, 1905. The ninth day afterwards the reaction commenced, and the tenth day piroplasma equi was very frequent. It increased in numbers during the following days, and the donkey died on January 28 or 29, 1905. *Post mortem* was made in the morning. The flesh had a slight brownish hue. There was a big *ante-mortem* clot in the right and a red clot in the left ventricle. There were no petechiæ in the heart. The liver was slightly jaundiced. The spleen was very much enlarged, about four to five times its normal size; the pulp was very soft. The kidneys were pale, and the bladder was full of red urine.

(2) Donkey 744, Argentine, similar origin as previous one, was injected subcutaneously on February 15, 1905, with 10 cc. def. blood of donkey 306. A first reaction was noticeable after five days, and piroplasma equi was seen for the first time on January 22; it was still present on January 24, and absent on the following day. Between the first and second reaction was an interval of four days. The second reaction lasted three days, but no piroplasma was traceable during that time.

Conclusions.

The blood of a donkey immune against equine piroplasmosis produced a deadly disease in a susceptible donkey and a distinct reaction in a second one. There is accordingly but little prospect of utilising the blood of an immune donkey for inoculation purposes against the piroplasmosis in donkeys.

Summary of Conclusions.

(1) The piroplasma found in the horse, the mule, and the donkey, represents the species of piroplasma equi, as first found in the horse.

(2) The disease caused by this piroplasma is inoculable with blood of immune animals into susceptible ones belonging to the domesticated species equi.

(3) The horse shows the greatest susceptibility for this piroplasma; the donkey is less and the mule the least susceptible.

(4) The possibility of a practicable inoculation against piroplasmosis stands in the reversed order of the susceptibility. The mule may be safely inoculated with immune blood of any of the three respective equines. The immune horse blood produces the severest reaction. The immune mule blood causes little reaction, and so does the immune donkey blood.

For practical purposes the inoculation of mules with blood of immune donkeys may prove successful.

The donkey proves to be equally susceptible to immune blood taken from horses and donkeys, and shows the slightest reaction to the injection of immune mule blood.

For practical purposes the inoculation of donkeys with blood of immune mules may prove to be successful.

The horse being extremely susceptible to piroplasmosis due to the injection of immune blood from the horse and mule, seems to suffer less from inoculation of immune donkey blood.

For practical purposes the inoculation of horses with blood of immune donkeys will have to be considered.

Reviews.

SURGICAL DISEASES OF THE DOG AND CAT; WITH CHAPTERS ON ANÆSTHETICS AND OBSTETRICS. By F. T. G. HOBDAY, F.R.C.V.S., F.R.S.E. Cloth Bound. 566 pages. 245 Illustrations, and one plate. Published by Baillière, Tindall and Cox, Henrietta Street, London, W.C. Price, 10s. 6d. net.

With the above title we welcome the second edition of "Canine and Feline Surgery," which made its appearance in 1900. Since that comparatively recent date much progress has been made in surgery of the smaller domesticated animals; new operations have been suggested and carried out with varying success; others have been adopted from human surgery, and much greater care has been bestowed upon the recording of cases coming under the observation of practitioners. The author of the present work is largely responsible for the latter state of affairs, partly through the effects of the first edition, and partly through the enthusiasm with which he usually manages to infect his professional brethren when they come into personal contact with him. I have dilated upon this point because it has a direct bearing upon the new edition, as is evidenced by the graphic accounts of a considerable number of cases and the treatments which have met with success. These records of actual cases are always more convincing, and more interesting and instructive, than hypothetical cases.

The parent work has been re-written and re-arranged and re-enlarged from 152 pages to 366 pages. The value of the text is considerably enhanced by 241 illustrations (the vast majority of which are reproductions of actual photographs) and several skiagraphs. These will be of great assistance both to the student and practitioner, as they can but facilitate diagnosis. No one could fail to diagnose rupture of the gastrocnemius tendon after a glance at fig. 233, nor would any student have any hesitation as to the method of operation for entropion after once seeing fig. 88. The new portions include a chapter on "Difficult Parturition: Its Sequel and treatment;" and Gersung's wax operation for everted rectum is also detailed in a very lucid manner.

General anæsthesia is a subject which the author has made practically his own. There has not been found necessity for much alteration, but two new illustrations of chloroform apparatus have been introduced, one of which shows the author's pattern of electrical motor pump, a useful enough instrument, but the purchase of which would only be warrantable in infirmaries where large numbers of operations are performed. Reference is also made to the use of morphia and of chloral, agents which are not likely to become very popular on account of their uncertainty of action in the smaller animals.

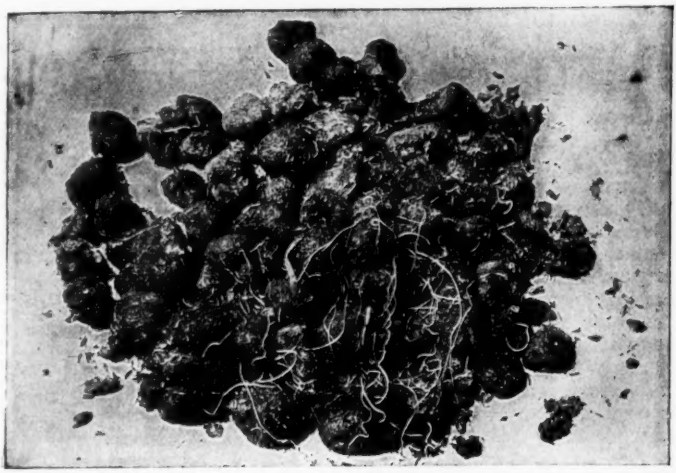
With reference to local anæsthesia the author says: "In order to be on the safe side the operator should never allow more than one-tenth of a grain of either cocaine or eucaine for each pound of the live body weight of the patient to be absorbed into the system at one time. It seems to us that although this may work out perfectly safely for the smallest of our patients, a maximum dose compatible with safety for large dogs should have been included. A student might be forgiven for inferring from the quotation that he might give 6 grains of cocaine with perfect safety to dogs weighing over 60 lbs. We consider that 2 grains of cocaine freshly prepared solution is the maximum safe-average dose, and suggest that the student or practitioner should add to the quoted sentence "regarding 2 grains as the maximum dose for large dogs." The author also allows a choice in the strength from 1 to 10 per cent. solution. We think the range too wide. We have found 1 and 2 per cent. solutions practically useless, and have had by far the best results from 4 to 5 per cent. solutions. In our hands the use of 30 mm. of 40 per cent. solution has given far more satisfactory results by hypodermic injection than 60 mm. of 2 per cent. Fig. 122*a* is intended to show the sites of incision for various operations. It seems to us that the sites marked for abdominal sections are all too far forward. However, since the umbilicus is a fixed point, the diagram is very useful in showing the relative, though not actual, sites of operation.

It is very remarkable that so little literature exists on tumours of the small domestic animals. A much felt want in this direction is filled by this work. The author gives us a new chapter on the subject, together with numerous photos of malignant and benign tumours in various situations.

Taken as a whole, "Surgical Diseases of the Dog and Cat" can only be recorded as an excellent work, and one of very great service to the student and practitioner alike. The publisher's share of the work is highly commendable, both with regard to the clearness of the type and the general excellence of the illustrations.

G. H. W.

THE UNIQUE CLAIMS OF MOLASSINE MEAL PROVED.



Photograph of a portion of the manure from "IRENE" before being fed with Molassine Meal.

It is a common thing for horse-owners and stock-feeders to write to the Molassine Co., Ltd., pointing out how much better some other foods are from an analytical standpoint than Molassine Meal.

The reply is, that **it is not what an animal eats, but what he digests,** that is of service. If horse-owners and others would but examine the manure in their stables, they would often find that a large proportion of the food given to animals passed through in an undigested state, and that its money value might just as well have been thrown away. This represents a serious loss during the course of a year, and the intelligent stock-feeder should give it his careful attention.

The photograph represents manure from "Irene," before feeding on Molassine Meal, and it will be seen that it contains a large proportion of oats and beans which have come from the animal just as they were eaten.

The photograph shows that the oats and beans had begun to germinate, and distinct growths of oats and beans are to be seen, showing clearly that on account of the low vitality of the animal, fermentation and other stomach troubles had set up, which affected the digestive organs and made them incapable of performing their proper functions.

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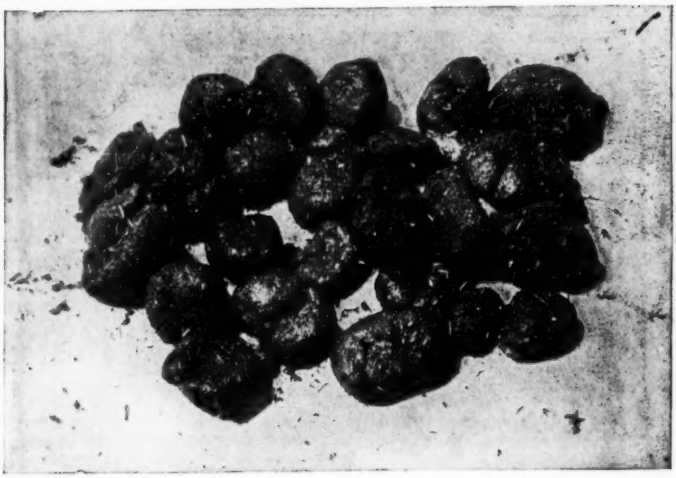

Photograph of Manure from "IRENE" after feeding with Molassine Meal.

This photograph shows manure some weeks after "Irene" had been fed on Molassine Meal, and after it had lain sufficient time for germination to take place in case there had been any undigested grain pass through. It is quite free of any cereals and is perfectly healthy and inodorous, showing that Molassine Meal has had its usual effect upon the stomach and digestive organs, and had brought the animal to a perfectly healthy condition, **and able, as we claim, to obtain the full amount of nutriment of his entire food,** to the financial benefit of the owner.

Another mistake buyers sometimes make is that they attempt to compare the value of Molassine Meal with cake or other food. Our answer invariably is, that you cannot compare Molassine Meal with any other food, as there is no comparison. **It is not only its actual feeding value, but the tremendous additional value it gives to all other foods, in consequence of its antiseptic and digestive properties.**

Horse-owners and stock-feeders can test this feature for themselves, when they will have the same results.

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Personal.

MEMBERS of the profession will regret to hear of the serious illness of Mr. Albert Wheatley, F.R.C.V.S., of Reading, and all will wish him a speedy recovery.

In the recent Professional Examinations Mr. Charles Hartley, F.R.C.V.S., of Lincoln, was selected to act for Mr. Wheatley as Examiner in Stable Management for Class B.

The following abstract from a speech made by a high authority in South Africa, and quoted in the *Transvaal Agricultural Journal*, is very gratifying, as showing that the work done by members of the profession in South Africa is being appreciated. The testimony of the President of the Western Province Agricultural Society is instructive:—"A couple of months ago the cry in the Robertson and Montagu District was, 'What is the good of getting a man from the Government? We know more than he does.' That was before a veterinary surgeon came there, but after he came and had left they had all learned something. I saw over one hundred farmers come in to see certain work he was performing, and which he did easily. They were much surprised to see the work he did; they were loud in his praise, and went so far as to ask me to see the Veterinary Department in order to try and get a man appointed for the district. The services rendered by Dr. D. Hutchinson, Chief Veterinary Surgeon, Mr. D. E. Hutchins, Conservator of Forests, and Mr. C. E. Lounsbury, are recognised throughout the world, and it is impossible to value their work too highly. What is really needed is to afford them adequate support, as well as to introduce other investigators of like calibre and zeal to undertake similar branches of work which urgently need attention, and for which no provision has hitherto been made. We have already remarked that any Colony which does not place the experimental farm in the fore-front of agricultural development is destined to fall; and South Africa—if she would succeed with her farming industries—must surely follow the illuminating examples of Canada, the United States, and Australia."

COMPLIMENTARY DINNER TO PROFESSOR SIR JOHN MACFADYEAN, M.B., B.Sc., M.R.C.V.S.

ON Thursday evening, January 4, some 200 members of the Veterinary Profession entertained Sir John McFadyean as their guest at a dinner held in the Empress Rooms of the Trocadero Restaurant. The Right Hon. Mr. Ailwyn Fellowes, M.P., presided as Chairman, and a most enjoyable evening was spent. The toast list was limited to those of His Majesty the King, the Guest, and the Chairman, and each of the two latter was received with musical honours. The Secretary of the Committee (Mr. William Hunting, F.R.C.V.S.) deserves every congratulation on the manner in which he arranged the gathering, which passed off without a single hitch and which everybody voted a huge success. The photograph we reproduce was specially prepared for the VETERINARY JOURNAL at very short notice by the courtesy of Messrs. J. Jacks and Co., of Glasshouse Street, W.

New Instruments and Appliances.

A NEW AND SIMPLE DEVICE FOR COLLECTING AND PRESERVING SMALL QUANTITIES OF BLOOD FOR MICROSCOPICAL EXAMINATION.

SIR,—I have the honour to forward under same cover a small appliance which I think will prove of some utility to the busy practitioner in cases where the examination of blood is necessary. It has been devised primarily for use in this Colony, where our distances are long and the opportunities of microscopical observation limited. As you will see, the appliance serves as an accessory to the Thoma-Zeiss counting chamber for the quantitative estimation of the corpuscle, but chiefly for the preservation and transmission of samples of blood in known dilution. With the diluting fluid supplied (sod. sulph., sod. chlor. and hydrarg. perchlor.) the corpuscles will be found to retain their contour for such a time as to render possible the transmission of the blood sample for journeys taking even many days. The intra-corpuscular parasites (Malaria, Piroplasmosis, &c.) can thus be critically examined at long distances from the point of collection, and at the same time accurate estimation of corpuscles can be made if necessary in conditions of anæmia, &c. The small capillary tubes enclosed are, as you will notice, adapted to contain one-hundredth part of the bulk of the fluid (the actual capacity of the capillary tube being equal to the bulk occupied by 99 mg. of mercury), and I find that the margin of error between preserved blood taken from this "Clinical Tube" and a fresh sample made with the Thoma-Zeiss pipette to be negligible. I append twenty-one estimations taken at random, which will serve, I believe, to satisfy the hæmatologist on this point.

Actual counts made to compare results with Clinical Tube and Zeiss pipette:—

Clinical Tube	Thoma-Zeiss	C. T.	Percentage of Error
4,995,000	4,960,000	35,000 −	·705
4,960,000	4,960,000	Both alike	nil
4,910,000	4,860,000	50,000 +	1·183
5,300,000	5,220,000	80,000 +	1·532
5,280,000	5,220,000	60,000 +	1·149
4,450,000	4,500,000	50,000 −	1·111
5,180,000	5,100,000	80,000 +	1·568
5,100,000	5,100,000	Both alike	nil
5,040,000	5,000,000	40,000 +	·860
5,100,000	5,060,000	40,000 +	·786
5,140,000	5,200,000	60,000 −	1·153
4,890,000	4,840,000	50,000 +	1·033
4,770,000	4,810,000	40,000 −	·831
4,870,000	4,940,000	70,000 −	1·417
4,850,000	4,940,000	70,000 −	1·422
4,960,000	5,020,000	55,000 −	1·095
5,030,000	4,990,000	40,000 +	·801
4,890,000	4,790,000	100,000 +	2·087
5,435,000	5,440,000	5,000 −	·091
4,590,000	4,540,000	50,000 +	1·101
4,930,000	5,000,000	70,000 −	1·400

making a difference of about 1 per cent. (on twenty estimations).

The chief advantages which I hope may be found to attend the use of this little instrument are its ready transmissibility and the simplicity of its technique. Other advantages, such as the possibility of the preservation of samples of blood until examination can be made, &c., will occur to most practitioners. The cost of the appliance is about threepence, and with care the same tubes may be used more than once.

Yours sincerely,

H. WATKINS PITCHFORD, F.R.C.V.S.,
Government Bacteriologist.

The Laboratory,
Pietermaritzburg, Natal.

[The appliance sent by Mr. Watkins Pitchford consists of two small thin glass tubes, each about an inch and a half long, and their contents. One contains the fluid alluded to, and the other holds two capillary tubes and a bayonet-pointed needle. The two can readily be placed inside an ordinary clinical thermometer metal case, and conveniently carried in the waistcoat pocket.—ED.]

INSTRUCTIONS FOR USE OF THE CLINICAL BLOOD TUBE.

This tube has been devised for the preservation or transmission of a sample of blood pending microscopical examination or numerical estimation.

The large tube contains a measured quantity of a diluting fluid which also prevents the coagulation of the blood added to it.

The small capillary tube is made to contain a column of blood 1/100th the bulk of the diluting fluid. When the blood and the fluid are mixed a one per cent dilution of the blood results. Spare capillary tubes are provided.

TECHNIQUE OF COLLECTION.

Remove the cork from the tube of diluting fluid—the tube can now be laid upon its side without escape of its contents.

A fair-sized drop of blood is necessary. This can be obtained most readily from the human subject by puncturing the lobe of the ear. The lobe is rendered hyperæmic by rolling between the thumb and finger, it should then be rapidly cleansed with soap and water and wiped dry with a clean handkerchief. The puncture, which in this region is almost painless, may be made with the sterile needle contained in the case.

In the lower animals a fine hypodermic needle may be inserted into the jugular vein, or a puncture made into a prominent vein of the ear. If the animal be too restive to permit of accuracy of manipulation, a drop or two of blood may be collected upon a watch-glass or clean coin, and from the drop a capillary tube should be filled without delay.

The end of the capillary tube is immersed in the drop of blood, which will readily enter it if the tube is inclined slightly below the horizontal. To prevent the entrance of bubbles of air care should be taken to keep the end of the tube completely immersed in the drop of blood during filling.

The fragment of tube, when filled, is gently wiped with a piece of soft paper in order to remove any superfluous blood, and is then dropped into the diluting fluid contained in the larger tube. The cork is replaced in the tube, which is then thoroughly shaken until all the blood in the capillary tube has escaped and become uniformly diffused throughout the diluent.

The tube should then be replaced in the metal case and forwarded for examination.

THE AULTON PATENT PNEUMATIC BOOTS, PADS, BANDAGES, &c.

THESE articles present a new departure in the way of appliances for use with horses, pneumatic principles having been adapted to different articles to obtain various results. Racing leggings are so constructed that a pneumatic pressure is constant, and gives support to the tendons and sinews to prevent sprains and breakdown.

The boots are designed for horses which strike their joints.

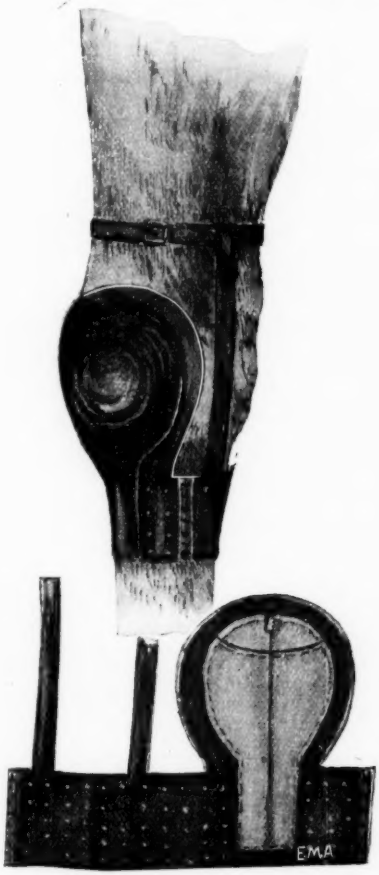

FIG. 1.—Pneumatic knee-cap.

FIG. 2.—Combined pneumatic tendon and joint legging.

Fig. 1.—Pneumatic knee-cap. A new form of knee-cap in which the advantages over the old style are: (1) That it cannot become dis-

placed. (2) Is obliged to remain in the right position if the horse falls down, and so forms a cushion for the knee to rest on. (3) Owing to the pneumatic lining pad the knee cannot even be bruised. (4) Does not impede the horse's action. (5) Can be extended down the leg—4, 6, 8 or more eyelets—and so protects the shin (thus lengthened it has been found valuable for horses travelling by rail).

Fig. 2.—Combined pneumatic tendon and joint legging. Specially adapted for polo and jumping. A great safeguard against over-reaches and bruised heels.

Another apparatus is made for bursal enlargements, such as wind-galls, thoropins, &c.

The manufacturers are Messrs. Arnold and Sons, West Smithfield, London, from whom all further particulars may be obtained.

VETERINARY PARLIAMENTARY CANDIDATURE.

We are informed that Mr. Lawrence C. Tipper, M.R.C.V.S., is standing as Parliamentary Candidate for the Ilkeston Division of Derbyshire in the Unionist interests.

Correspondence.

To the Editor of the Veterinary Journal.

REVIEW OF THE "CATECHISM OF THE PRINCIPLES OF VETERINARY SURGERY."

Dear Sir,—Kindly grant me space in the Journal for the following:—

In the October Journal a review of my latest work, "Catechism of the Principles of Veterinary Surgery," has appeared. A repeated and careful study of its contents has impressed me with the fact that the critic is not extending me a "square deal."

He refers first to the fact that many phrases and terms are purely American, and would not be allowed in present-day up-to-date English literature. Of course, no attempt in a work of this kind has been made to produce a classical work to enrich English literature, nor is it the purpose of my work; I am contributing to veterinary literature. At the same time, I will not believe that those presiding over the destinies of English literature are so narrow-minded as to exclude reading matter which is purely "American." Scientific bodies are liberal, they co-operate—isolation means deterioration. The empiric only excludes, his position is the only correct one, the other fellow is not in it! My critic says: "For example, we have on page 215 a chapter on 'Articular Contracture,' in which the following is asked:

'Name the various forms of joint contractures.'" The word 'joint' is an oversight in proof reading, and steps have been taken to correct it. Any fair critic will admit that the preceding and succeeding questions show plainly what was meant.

In the chapter on wounds I simply request the critic to peruse it again, and come up like a man and correct the impression he leaves by partial quotations and misquotations. As regards Dollar's operating table I have no corrections to make, but wish to state that my criticism of that contrivance is based upon wide personal experience (also financial distress). I repeat: Operating tables are theoretically ideal—practically useless to the general practitioner. If they are the "conditio sine quâ non," why are they not extensively used, their expense to-day does not render them beyond reach? The word "tupfer" is accused of being an Americanism by the learned critic; I wish to draw his kind attention to the fact that it is a very German word, meaning a mop or swab, and being a German creation (the "tupfer" is) it has been adapted and is quite prevalent in English print.

I am further accused of having created a book which is "palpably an attempt (and a misleading one at that) to give the student a cram-book." Such a passionate criticism, bordering on libel, is beyond reply; I stand on my reputation as a professional gentleman.

Last, but not least, my critic makes the astounding assertion that the pathological and surgical theories would not be accepted by the Board of Examiners of the R.C.V.S. In other words, every pathological and surgical theory offered by me is wrong. Well, "I am from Missouri, and he (the critic) will have to show me." The work is a specialty and not to be considered on ordinary lines.

Thanking you in advance for the courtesy of granting me space in the Journal,

I am, yours respectfully,

Prospect, Ohio, U.S.A., *November* 20, 1905.

W. E. A. Wyman, M.D.V., V.S.

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Chief Bacteriologist and Analyst to the Natal Government.